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Guest Editorial

The Civilian Doctor Goes to War

DURING 1941 and 1942 when reserve medical officers were leaving their homes and their civilian practices and pursuits in large numbers and arriving at their first duty assignments in military units there was a certain amount of apprehension, perhaps a little head shaking, among the old regulars who were wondering how it would all work out. At the same time the reserve medical officers, no doubt, were also somewhat concerned about the new life and work and were quite naturally speculating as to how difficult it might be to work with the regulars and to conform to all the new and strange ways of doing things.

Enough time has passed now so that the whole picture has come into reasonable perspective and there have been plenty of trials and testings upon which to base a fair report. The observations set down here have been made entirely in the navy, but American human nature and the principles and practice of medicine are of course the same in the two armed services. There are probably no essential differences in the military phases of the services as they affect the life and work of the medical officer; in fact there are greater differences between different units of the same service than there are between the two services as a whole.

One can now generalize strongly and unequivocally that the reserve medical officers have hung up a brilliant record in this war. In terms of such things as lives saved, man-hours conserved, health guarded, preserved or restored, the record is one of vastness, one of tremendous power. In the matter of indifference to self comfort and security, in disregard for personal danger and exhaustion in battle actions, the record is filled with valor and honor.

Great things were expected of the reserve doctors but their achievement as well as their spirit and demeanor so surpassed expectations that the performance has been a heartening surprise to the citizenry, to the old regulars and, we would suppose, to the reserve doctors themselves.

Not that they found everything in and about the service work and life a paradise of perfection or a hunky dory realm of moonlight and roses. Far from it. And so much more to their credit that under conditions of frequent hardships, hazards, bedevilments and bewilderments of a hundred sorts they maintained their morale and a good deal of inward contentment even while outwardly indulging in the favorite and very human military pastime of griping.

Their most sincere and serious gripe concerned their uprooting from the home and family. This was the unkindest cut of all. Even unmarried ones longed for the home scenes and friends. And this misfortune was particularly grievous when the reserve officer happened to land in an inactive spot, where there was comparatively little work or excitement to occupy him. Inaction engendered boredom and provided him with the time for thinking, brooding, and wondering (with a few homely expletives thrown

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in): "What good am I here and why did I ever get into this thing?"

One complaint never heard is that a substantial financial sacrifice has been made in giving up one's civilian income for the military pay. Even when this has resulted in important financial readjustments, the loss of property, the scaling down of living standards, neither they nor, indeed, their families have allowed themselves a word or thought of annoyance or regret. Rather, they seem to have found a large measure of pride and happiness in their astonishing ability to get along so well under the new financial pattern.

What they find acutely oppressive and bewildering at first is the inordinate amount of paper work and red tape. They were accustomed to more direct and simple ways of getting things done. But it gradually comes to them that the larger the organization the more complex it must be; that the army and navy medical departments are vastly larger in scope than any medical organization of their former association; that therefore the records, reports, checks, paper machinery of every sort must be multiplied. And as they analyze the needs for it they see some of the reason in it. As reason begins to appear in it much of the sting goes out of it. But not all. Because no one wants to defend excessive paper work or red tape and there is always the strong belief that a considerable part of it could still be classed "excessive and without the support of reason".

It is almost banal to remark that one is happiest in situations where he can do his best work. But this psychological truism has a strong and special application in the life of the reserve medical officer. If he can follow his own specialty, if he can use the talents he has spent a good part of a lifetime in developing and under conditions, such as in a large military hospital, similar to those of the home office, clinic or hospital, he finds himself in a high state of professional and personal satisfaction. But strange to say, the chagrin that comes to him when first assigned to a strange field is rather quickly dispelled when he begins to master the new trade and feels that he is becoming a useful worker in it. For example, there are surprisingly large numbers of jobs and amounts of work for obstetricians, gynecologists and even pediatricians in the service but not enough for all of them. So they and others of other clinical specialties often are assigned to field sanitation units, to desk jobs, administrative capacities, various extra curricular missions. And usually they amaze themselves and certain others by catching on to the new tricks in a hurry and performing the new job not only enthusiastically but exceedingly well. One of the most competent and highly regarded brigade surgeons (a purely administrative and principally military position) I have encountered among Marine Corps units was a reserve medical officer who had spent an extensive and highly successful professional lifetime as an ophthalmologist. He was discouraged, frightened and disappointed over the job at first but in the course of a few weeks was having the time of his life because he and every one else could see that he was making good.

One of the trying and puzzling phases of military life as seen by the reserve doctor lies in the long waiting periods when nothing is happening and there is almost no work to do but with large numbers of medical personnel on hand. He finds it difficult, during his early months in the service, to reconcile these situations with other situations where military hospital staffs are swamped with work and seriously lacking in medical personnel. Later he sees that military developments can not be foretold with precision and that medical personnel must be moved in anticipation of events which may happen much later than expected and frequently do not happen at all at the places where they were anticipated. He finally sees, too, that interminable waiting is one of the commonest as well as one of the most trying experiences in a war. And he learns

that the big reason why the busy hot spots are so short of doctors is that there just aren't enough doctors in the military services to fill all the jobs where heavy work is being done as well as the places where a state of readiness is required for expected future events.

As to the professional services of the reserves and their contributions to the science of medicine during the present war, countless volumes will be filled with the story for the next hundred years or more and Americans will be talking about it in medical and lay circles during the life of the next few generations. And this covers practically all fields of medicine—research laboratories, operating rooms, sanitation units, preventive medicine groups, field surgical units working in fox holes, physical reconstruction units, neuropsychiatric workers, tropical medicine experts.

But the record has not been all one sided. While the civilian doctor who joined the service brought great things to it he also acquired many things from it. He gained much medical knowledge from a huge store of medical experience and comparing of notes with American medical officers from every corner of the United States. He saw more of life in his three or four years of war than one sees provincially in three or four decades of peace.

He will one day come home from the wars, happy to be home but happy to have an absorbing topic for conversation and thought for the rest of his life. And when he tells his grandchildren about it, or when he talks about it some day to young doctors who are not yet born, it will be natural and proper that his listeners will see a gleam of pride in his eye.

R. P. PARSONS, *Captain, Medical Corps,*
United States Navy.

EDITOR'S NOTE: Dr. Parsons is a Captain in the Medical Corps of the regular Navy, having served continuously since the beginning of World War I. His opinions expressed here are, no doubt, based largely on his experiences as commanding officer of naval hospitals, one of which was the South Pacific hospital "Mob 3", known to the readers of his recent book, "Mob 3". Dr. Parsons is also author of the well known Joseph Goldberger biography, "Trail to Light".

Floral Eponym (28)

DIOCLEA LEGUMINOSAE
DIOCLES OF CARYSTOS, C. 350 B.C.

D. Leguminosae are tender shrubby twiners, with delicate trifoliolate leaves and blue, violet, scarlet or white flowers borne in clusters which have been roughly compared to Wistaria.

Diocles was the last of the Hippocrateans and is said to have been the one who collected the Hippocratic books, although this is disputed. It was he and Philistion who added the four Hippocratic humors to the four elements and their qualities. He was the first physician to write in Attic Greek. Diocles was no mean anatomist and was a keen embryologist. He was the first to call attention to the *punctum saliens.* He wrote the first work on Anatomy as well as the first on Hygiene, and also the first Herbal.

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SYMPOSIUM ON NUTRITION*

WILLIAM H. HIGGINS, M.D., *Chairman*
Richmond, Virginia.

Among the recent discoveries in medicine prior to the World War none has been more far-reaching in its effect than that of nutritional deficiencies and their correction, with ramifications extending into obstetrics, pediatrics, surgery, and industrial medicine. So I feel we have a subject this afternoon that enters into the specialty of everyone who is present.

With the outbreak of the war it was a perfectly natural move on the part of our Government to select a man who has been pre-eminent in this work on nutrition. In order to get a person of that type the Government drafted the professor of medicine of Vanderbilt University; and he is now connected with the Surgeon-General's office, in charge of the nutrition division of the armed forces of America. Our guest speaker this afternoon is a man whose writings have been the guiding light to those of us who have followed this particular phase of medicine. In all probability I would be correct in saying that a great deal of the good that medicine has done for the people of America has been offset by our abysmal ignorance of the factors that enter into disease due to nutritional deficiencies; and I know of no subject that is more timely, from the standpoint both of civilians and of our armed forces, than a very frank and free discussion of this subject this afternoon before this State Society. It therefore gives me a great deal of pleasure to introduce to you this man whom the Government has said is pre-eminent, and therefore we are very happy to have him talk to us this afternoon. Colonel John B. Youmans will speak first and will give us an introductory outline of nutrition. He will be followed by the other speakers on various phases, and then our guest speaker will close with a review of the factors that enter into the cure of this problem of nutritional deficiency.

Introduction

JOHN B. YOUMANS, COLONEL, M.C.,
Washington, D. C.

I think that perhaps my function here this afternoon could best be described as that of the frontispiece and the end piece of a book—something perhaps a little bit interesting and in a way decorative, but with the real meat of the book in between.

Nutrition is a basic biologic process which affects all living things and is a factor of fundamental importance in health and disease. There is a tendency for us as physicians, however, to have an interest in deficiency disease and not in nutrition, to consider nutrition as something divorced from clinical affairs and a matter for biochemists, physiologists, dietitians and home economists only. Such an attitude is incorrect and no more justified than an interest in heart disease and a lack of knowledge and interest in the circulation. Disease is present as soon as nutrition is not normal, just as heart disease is present as soon as the circulation is abnormal, though it may be impossible to detect this disease in its earliest stages. It is necessary, therefore, to have an understanding of nutrition as a background for an understanding of nutritional deficiency disease. Against such a background we can examine the nature and effects of disorders of nutrition, their development from mild disturbances to severe disease, the recognition and diagnosis of the deficiency states and the means of their prevention and relief.

In the time available today it is impossible to present even a partial account of the various phases of nutrition. There are, however, certain aspects which have a general bearing on and are important in the clinical application of nutrition, which I wish to discuss.

Although disease may be said to be present at the moment nutrition is inadequate, this does not mean at the moment food intake is inadequate.

*Symposium presented during the meeting of the Medical Society of Virginia at Richmond, October 23-25, 1944.

Usually there is a physiologic reserve store set up against temporary periods of deficiency which are sufficient normally to tide over a period of diminished intake. Such reserve stores vary in size with the various nutritive factors and this part has an important bearing on the occurrence of various deficiency under conditions of deficient intake. For example, it appears that members of the Vitamin B complex, particularly thiamin, are less well stored than others so that a deficiency occurs sooner than do deficiencies of other nutrients, such as, for example Vitamin A.

In practice, however, this factor of reserve cannot be relied on too strongly for the following reasons:

1. The reserve may never have been established.
2. Slight and inconspicuous but long continued dietary inadequacy may have depleted the reserves.
3. The reserve may have been lost through some unusual circumstance as an illness or disease which caused increased utilization, destruction or loss and the reserve never reestablished.

Failure to establish a reserve is seen in infants who fail to receive an adequate endowment of iron from their mothers and whose diet in early postnatal life is incapable of establishing such reserves, in fact, may not ever meet current demands. Slight but long continued loss of reserves is seen in persons whose dietary intake of protein is relatively deficient for even months and years, until the protein reserves are exhausted despite a lack of actual existing protein deficiency or evidence of under nutrition. Chronic febrile illness, intestinal disease, or surgical operations may exhaust reserves which were at one time adequate and lack of attention to necessary intake subsequently may prevent a reestablishment of the reserves.

Such a situation, i.e., a loss of the reserve store of nutrients, is of the utmost importance to physicians whose patients are apt to be the very ones made vulnerable by loss of these reserves. Following the loss of reserves further shortages result in deficiency disease, actual pathologic states characterized by disturbances in structure of functions even though these may not be recognizable in these first stages. The effects of such early and mild deficiency disease are obscure and usually non-specific. They include: (1) disturbances in growth and maturation; (2) abnormalities of pregnancy and lactation; (3) interference with immunity and resistance to disease and (4) interference with convalescence and recovery. With more severe deficiencies there appear the beginning signs and symptoms of specific deficiency disease and in still more severe deficiency states these blossom into clinical entities such as pellagra, scurvy and beri-beri.

It is thus apparent that deficiency states are significant in two ways, first, in their own right as diseases *sui generis*, and second, in their effect on other diseases. While both types are of interest and importance to the physician the latter are of particular interest because, as described above, his patients are the very ones who are apt to be vulnerable on the score of lost reserves and particularly liable to develop actual deficiency disease which will effect the reaction of his patients to other disease and influence its course and outcome. Furthermore, such effects may well occur at levels of deficiency which are not clearly apparent in the way of specific signs of the deficiency. The speakers who will follow me will describe some of these relationships and the effects of such deficiencies in the various field of medical practice.

Nutrition In Relation to Medicine

WILLIAM B. PORTER, M.D.,
Professor of Medicine, Medical College of Virginia,
Richmond.

Resistance to disease is a term frequently used, but it has so many complexities that one hesitates to single out any one factor as being essential to its stability. I should, however, like to present certain evidence indicating that nutrition is fundamentally concerned with the development of disease, its clinical course, and the restoration to a normal state of health.

One may define disease as being a failure of body structures to function normally which in turn is the result of functional failure, unaccompanied by histologic changes or failure accompanied by demon-

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strable cellular disintegration. These effects may be the result of: (1) deficiency of some essential substance (pellagra) nicotinic acid; (2) protoplasmic poisons such as chloroform, alcohol, and bacterial toxins; and (3) the invasion of the body by pathogenic parasites.

It is the purpose of this discussion to indicate briefly the role of nutrition in the basic reactions to these potential causative factors of disease. The failure and final death of essential body functions as the result of a deficiency of at least one vital substance is best illustrative by pellagra. Here there is widespread cellular disintegration and great disturbance of many physiologic functions. The rapidity of recovery is truly startling and is at times so rapid that one wonders how such physical and physiologic recovery can so promptly occur. It has been appreciated for a long time that there are factors not understood which are concerned with the development of liver cirrhosis in alcoholics. If this were not true cirrhosis would be one of the great scourges of the entire world for there is such a large percentage of the population who consume what might be termed an excessive amount of alcohol.

Mann at the Mayo Clinic was the first to show that carbohydrates protect the liver against certain noxious agents. Recently our attention has been directed to the protective effects of complete proteins and the B. complex vitamins. Others are impressed by the beneficial effects of whole blood transfusions, particularly as a protective agent against bacterial toxins.

PARASITIC INVASION

It has been pointed out by Ashford and recently by Suarez that there is no constant relation between the number of worm infestation and the anemia and other signs of parasitism. We ourselves were impressed with this many years ago and felt there must be some other factor which modified the patient's resistance to parasites. In 1928 we saw our first patient with severe parasitism incident to hookworm infection. At that time we were working with a liver fraction and this patient who had a hemoglobin of less than 10 per cent was put on liver supplemented with iron and an adequate diet. The patient made a rapid recovery and after he had recovered he was given a treatment for hookworm and he expelled more than 800 parasites. This convinced us that a patient's resistance could be so raised by supplementary substances, such as food, iron, and extracts of glandular organs, such as liver, that, even though he carried the parasites, he would have no adverse reaction to them.

Since that time this plan has been repeated on as many as 100 patients with similar results; even with animals the same situation exists.

One concludes from this that parasites become parasitic only in the event the patient's resistance is below a certain level and that this resistance is directly concerned with body nutrition.

Summarizing briefly: One may say that a deficiency of even one single vitamin, continuing over a period of time, can produce widespread cellular disintegration and disturbance of physiological function in many organs. Following the administration of the appropriate substance such as nicotinic acid in pellagra, prompt recovery ensues.

In the second place, nutrition is specifically concerned with the reaction of the body to noxious agents. This is best illustrated by the protection that can be had for the liver against alcohol, chloroform, and bacterial toxins by adequate diet and probably excesses of vitamins and transfusions.

Finally, the reaction to parasites is directly concerned with the state of nutrition and, in the solution of the parasitic problem, the economic status of the individual is equally as important as the so-called public health preventive measures.

Nutrition In Relation to Surgery

EVERETT IDRIS EVANS, M.D.,
Associate Professor of Surgery, Medical College of Virginia, Richmond.

A. PREOPERATIVE MANAGEMENT OF SURGICAL PATIENTS

This problem revolves about two distinct groups of surgical patients:

(1) Well nourished
(2) Malnourished

Relatively little attention would need to be paid to the first group, the so-called "well-nourished", if it were not for the fact that recent newer knowledge of nutrition has uncovered a situation in which we would question that there actually exists a large group of well-nourished individuals. "Food faddery", or simply poorly chosen diets, has resulted in a large number of the population actually not procuring an adequate diet, even though money and food were available. The economic pressure of a low income and the relatively high expense of food to large numbers of the population make it simply impossible for great numbers of our ward patients to secure an adequate diet. This may be considered an ugly statement of fact, but it is nevertheless true. Analysis of the plasma protein concentration of 240 ward patients in the Medical College of Virgnia Hospitals may indicate how untrustworthy these data may be in estimating the protein reserves of what Dr. Forbes and I chose deliberately as a group of supposedly healthy normal individuals. Plasma protein concentration was determined by ordinary laboratory tests, and the results showed that the majority of patients who had come in for what are considered elective operations had normal concentrations of total plasma protein. However, when the total circulating protein was determined by including in our laboratory tests the estimation of total plasma volume, it was soon learned that there actually exists a deficiency in total circulating protein in these ward patients, because of a diminution in total plasma volume. We may presume on the basis of studies made by Whipple that there exists a dynamic equilibrium between tissue and circulating protein; we have concluded that our data probably indicate a deficiency in tissue protein reserves in these patients who ostensibly have normal reserves because of a normal concentration of plasma protein.

We are of the opinion that these data may explain the often observed phenomena of an apparently well-hydrated individual possessing a normal plasma protein concentration prior to operation, but, postoperatively, early and rapidly develop hypoproteinemia. The plasma volume of persons with low tissue protein reserves may possibly diminish in order that the oncotic pressure remain at a more optimum level. This, we believe, to be the case because hypoproteinemic individuals sometimes have a decreased plasma volume.

These data illustrate how dangerous it may be for the surgeon to assume that tissue reserves are adequate for a surgical procedure in the face of normal plasma protein concentration. Therefore, if possible, patients who are to undergo major surgery should be placed on the best possible diets before surgery is undertaken. Unfortunately, in many patients this is impossible because they either cannot or will not eat. Therefore, the only practical preoperative management entails the intravenous administration of large amounts of glucose, vitamins, and protein—and red cells if the patient is anemic. Intravenous protein is best administered as amino acids, and about 150 grams per day is to be given. Plasma is a poor substitute because of its unavailability and expense (150 grams, 100-150 dollars a day). Amino acid solutions are now available (Mead Johnson and Stearns). Vitamin requirements in ill patients undergoing surgery may be extremely large, but probably are no wise as important as protein. With our extreme interest in protein therapy at the present time, we should not forget that probably the greatest single advance in the preoperative management of surgical patients has been the use of large and frequent *whole* blood transfusions.

Unfortunately, no feasible method is yet available for the administration of fat by the intravenous route. Let us not forget that no one has yet developed a preparation for intravenous administration that rivals in any way the remarkable efficiency of a good wholesome diet, prepared by a person who knows how to prepare food for a healthy family; therefore, if possible, give food by mouth—not by vein.

Why is nutrition so important as a preoperative measure in surgery?

Proper nutritive balance, by food, intravenous protein, sugar, and vitamins, or whole blood greatly extends the indications for surgery. Extensive surgery imposes a great risk on healthy persons. This risk becomes prohibitive if the patient is malnourished. A week spent preparing a malnourished patient with an adequate diet may often permit the safe prosecution of an extensive surgical operation, so that operative shock may be entirely abolished. Also, the operative management of many procedures is greatly facilitated if tissues have been restored to their normal tone and texture (viz. gastrointestinal anastomosis).

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B. POSTOPERATIVE MANAGEMENT OF SURGICAL PATIENTS

The discussion here may be divided into two categories: (1) those patients who cannot take food by mouth, (2) those who can eat.

Our aim with both groups is to eliminate the immediate postoperative period of *acute starvation.* Education of both surgeons and patients is necessary here. It is simply foolish to believe that, after every abdominal operation, the patient must be starved for three to four days. Our goal should be that patients take an adequate diet by mouth as soon as possible after operation, and by this we do not mean only fruit juices and meat broths. These contain little material of any value. Most surgical patients will generally eat if one or two requirements are met.

(a) *Early Ambulation.* We must get patients out of bed as soon as possible after operation, and that means after two or three days for most patients, except the very ill.

(b) *Serving of Hot, Appetizing Food.* Perhaps this is the crux of the whole matter. We shall not dwell on this matter at length, because we will offend the sensitivities of most hospital dietitians. If ever a revolution in hospital management was needed, it is in the manner of preparation and serving of food to patients (and I might add for what it is worth—to internes and residents). Too often earnest attention is devoted to the calculation of a patient's caloric and protein needs, only to discover that his requirements are not met simply because he leaves uneaten on his tray most of the proffered food.

In certain patients, resort must be made to alimentation by an indwelling jejunal tube. A rather complete diet can be given by this method. Dr. Spence of our interne staff has elaborated such a diet which has proved quite successful in the postoperative management of many of our surgical patients. With this diet one can easily get in 150-200 grams protein daily; nitrogen equilibrium and a positive balance has been readily attained. While whole blood transfusions are extremely important, it should be remembered that if building materials are made available, hemoglobin can be elaborated by the surgical patient, often in large amounts.

In certain surgical patients, such as those who have suffered extreme trauma or burns, the daily nutritional requirements may be considerably increased, to 300 to 500 grams of protein daily, if body wasting is to be avoided. If infection supervenes, large amounts of all food essentials must be made available, especially protein and vitamins. Postoperative complications, including infection, may often be avoided by the judicious feeding of surgical patients so that rapid wound healing is enhanced. Antibodies of protein nature cannot be elaborated if sufficient protein is not made available. (Paul Cannon.)

Finally, an ounce of prevention is worth a pound of care. Once bodily stores are depleted of protein, fat, and vitamins, they are replaced with great difficulty. Witness how difficult it is for a patient to regain weight once lost by illness. Our aim as surgeons, therefore, should be to bring a patient to the operating room in as good a nutrition state as possible, at the operation cause as little damage as possible, and begin the feeding of a highly nutritious, appetizing diet as early as possible postoperatively, so that the period of convalescence may be short.

In our present vigorous interest in nutrition, it is perhaps proper to recall that we may now be returning to the medical philosophy of classical times, when the doctor was chiefly concerned with diet, not only the regulation of a sick person's food, but with man's whole routine of eating and living. If patients are given the proper foods and the proper exercise, we may come to believe with the Greeks that "Nature is enough for everyone in everything."

The Effects and Manifestations of Nutritional Deficiencies In Obstetrics and Pediatrics

LEE E. SUTTON, M.D.,
Professor of Pediatrics, Medical College of Virginia,
Richmond.

Since this subject is to be covered by one individual, it is presumed that a pediatrist was selected because of his interest not only in the baby and child but in the development of the fetus which is to become his at the time of birth.

The development of the fetus depends a great

deal upon the health of the mother. Good health is based upon good nutrition. Ill health will not furnish the fetus the best for development.

Since the fetus is considered parasitic on its mother, that is, taking its nutritional needs from the mother at her expense, it is necessary that the mother receive all that is needed so that the fetus obtain optimum development.

Gross nutritional disturbances are rare in our normal women, but there is evidence that minor deficiencies may exist. Such minor deficiencies, which in a normal woman would take some time to develop, would be exaggerated by the increased demand of the fetus during pregnancy.

The diet of the pregnant woman, therefore, should be increased and balanced as to the necessary food elements.

Even though the fetus takes its nourishment from the mother at her expense there may be enough diminution in the mother's nutrition so as to affect the fetus.

It is estimated by McCollum that there is a rise in basal metabolism which is 23 per cent higher at term than at the fourth month with an average gain in weight of only 14 per cent. The normal desirable gain in weight by some authorities is from 15-25 pounds.

The fats and carbohydrates supply the energy in the normal diet, being a source of calories and generally sufficient. The fats help the absorption of vitamins and the carbohydrates are protein savers. Obesity and excessive gain in weight in the woman can be controlled somewhat by the regulation of fats and carbohydrates in the diet.

Garry and Stiven in a review of available data find that the weight of the newborn is not influenced by the maternal diet unless there are extreme deficiencies.

Protein is the important factor in cell growth. Metabolic studies indicate increased protein requirements during pregnancy and lactation. Williams states that protein deficiency may lead to nutritional edema and tends to anemia, lowered resistance to disease, and poor muscle tone and milk supply.

Barker found poor protein diets in about 50 per cent of his private and clinic patients, the symptoms of which cleared up under high protein diet.

A high protein diet tends to increase the milk supply while a decrease lowers it. Animal proteins such as meat, eggs, and dairy products should supply at least one-half of the protein in the diet.

Minerals are sufficient in general diet but during pregnancy and lactation calcium is a most important element. With the assimilation of calcium, phosphorus and vitamin D are closely linked. Nicholas *et al* have shown a decrease serum calcium in the last months of pregnancy with a return to normal after termination of pregnancy.

Mendenhall and Drake showed that such complaints as muscle soreness, spasm, numbness, tingling, and neuritis could be cleared by giving calcium and viosterol to these patients. A daily intake of 1.5 to 2.0 grams of calcium is necessary to supply the needs.

Observers have noted that the amount of calcium and vitamin D in the mother's diet affects the density of the infant's bone and structure of its teeth.

Mellanby has stated that calcium and vitamin D are often deficient in mother's diet and feels that this is one of the predisposing factors in the development of rickets.

Grant and Goeltsch have noted a greater tendency to rickets in rats born of mothers on a diet low in calcium, phosphorus, and vitamin D. When calcium is adequately supplied in the diet, phosphorus is usually sufficiently supplied. Much work has been published on the relation of maternal diet to the development of anaemia in the mother and the infant.

Murphy and Bowes demonstrated that anaemia was twice as prevalent among mothers who were taking an inadequate diet as compared with those on an adequate diet.

Neale and Hawksby give as the cause of anaemia in the mother: transfer of maternal reserve to fetus, poor diet, multiple and twin pregnancies or gastric anacidity or hypoacidity. Parsons and Hawksby give as a cause of anaemia in the infant either a deficient antenatal storage of iron or a deficient postnatal supply, or both in the presence of anaemia in the mother.

Mackay has shown that there was a lower level of hemoglobin in every month of the first six months of an infant's life, born of an anaemic mother, than of one not anaemic. Both maternal and infant anaemia can be prevented by adequate prophylactic doses of iron. The minimum requirement of iron during pregnancy seems to be from 15-20 milligrams, daily.

Vitamin A deficiency is probably not serious due

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to its widespread distribution and the distribution of its precursor carotene in our common foods. However, Wolbach and Howe have shown changes in the structure of the developing teeth of vitamin A deficient rats and guinea pigs.

Mellanby has also shown defective teeth in rats born of mothers on a diet deficient in vitamin A, and feels that vitamin A deficiency is responsible for absent or defective enamel and dentine in the human.

During pregnancy and lactation it is believed that vitamin A requirements will be adequately met by a diet supplemented by 4-6 grams of cod liver oil or its equivalent.

Since it has been shown by Cowgill that vitamin B_1 or thiamine chloride requirement depends on the basal metabolism and caloric intake, the increased metabolism in pregnancy and lactation demands an increase in thiamine.

Polyneuritis has developed during pregnancy, and such minor symptoms as aches, pains, apathy, and discontent are sometimes relieved by additional thiamine. In a nutritional study of pregnant women, Williams and his co-workers found practically one-third of their patients on an inadequate diet, and 30 per cent of those had moderate to pronounced nausea and vomiting compared with 10 per cent of those with adequate intake. Such symptoms as fatigue, cramps, paraesthesis, and dyspnea were found more frequently in those with low vitamin B_1 intake.

The amount of vitamin B_1 in the milk of lactating women depends to some extent on the amount of vitamin B_1 in the mother's diet as there is essentially no storage of this vitamin in the body. The stimulating action of B_1 on secretion of milk has been observed.

Since riboflavin is associated with oxidation processes of the cell the increased metabolism during pregnancy should probably increase the requirement of this vitamin. Forms of keratitis have been described as evidence of this deficiency.

A diet containing an adequate amount of milk, meat, eggs, whole grain products, and vegetables should supply the vitamin B complex in sufficient amounts.

Snelling and Jackson found a slight fall in the ascorbic acid level of the blood plasma toward the end of pregnancy, and a further drop during and after labor. This may be explained by the increased needs of the infant who will show a higher plasma level than its mother even though she is on a low vitamin C diet. This further explains why scurvy in the breast fed infant is so very rare. At one time it was though it couldn't occur.

Vitamin C is water soluble and is not retained in the body for long, therefore it seems that the vitamin C intake should be increased during pregnancy and lactation. The diet should contain orange, grapefruit, or tomato juice, as well as other fruits and vegetables.

Several observers have reported on the use of wheat germ oil which contains vitamin E in threatened abortion, and suggest that it is needed in normal pregnancy.

Vitamin K has brought about a reduction in the incidence of hemorrhagic disease in the newborn. It can be administered to the mother before the onset of labor or during labor with a definite effect on the prothrombin time of the infant. Vitamin K can also be given to the newborn at birth to prevent the disease.

An old saying "for every child a tooth" has some truth in it since dental decay is increased during pregnancy. Toverud has found defects in the teeth due to deficiencies in the maternal stores of essential food elements, such as, minerals and vitamins. Daro, in an antepartum clinic, found teeth and gums in a poorer condition in those who were partaking of an inadequate diet in comparison to those who were eating plenty of milk, raw fruits, and vegetables.

Mellanby feels that dental caries in the child is due to deficiencies in antepartum diets. From as early as the fourth month of fetal life the teeth are calcifying and the jaw bones are ossifying. Howe states that it is the duty of every medical practitioner to see that the normal processes of growth and development go on uninterrupted and that these processes are influenced more strongly by nutritional states than by any other factor.

Studies have been made in clinics regarding diets on groups of pregnant women.

Ebbs *et al* in Toronto and Balfour in Great Britain have supplied additional foods to diets of pregnant women. To their ordinary diets, milk and eggs containing vitamin A and D, foods rich in vitamin B, and fruits were supplied. Striking results were obtained. Ebbs reports on women during the last half of pregnancy that the incidence of miscarriages, premature and stillbirths, the number of infections

in the mother, as well as her general condition, mental and physical, were much better than those of a control group.

Balfour studying groups of pregnant women in England and South Wales reports that the maternal death rate in 10,384 obstetrical cases in which the supplemented diet was supplied to needy mothers during the last three months of pregnancy was 1.66 per thousand total births as against a rate of 6.15 among 18,854 control cases in the same districts during the same period. One death from sepsis in assisted group as against 45 in nonassisted group was observed as well as 43 per cent less stillbirths and neonatal deaths in the assisted group.

It seems from the above that pregnant and lactating women require more calories, proteins, minerals and vitamins than the nonpregnant women.

In feeding the infant, human milk is considered the ideal food supplying the essential food elements for the early period, provided the mother is receiving the nutrition that gives her all the necessary elements. It is found, however, when the infant grows older, human milk will not meet the infant's needs.

Of all the elements, vitamin D may not be adequate in human milk during the early period of nursing as the mother may not be able to get enough vitamin D from the effects of sufficient ultra-violet rays or vitamin D in the food. Therefore, additional vitamin D can be given the infant.

The baby at birth has sufficient iron storage to maintain an adequate hemoglobin level for several months; after that time, iron in some form should be added to his diet in order to prevent the development of anaemia.

Through observation of the development of the infant it is believed that additional foods should be added to the breast fed infant's diet at three to four months of age and vegetables and fruits shortly afterward. These additional foods not only add calories but bring to the infant an increase in minerals and vitamins which, should there be a slight shortage in the breast milk, will be taken care of.

Some observers have found that additional foods can be added to breast milk diets earlier in the infant's life with satisfactory response of the infant's development.

When artificial feeding such as cows' milk is substituted for human milk, nutritional disturbances are more frequently met with. The chief nutritional disturbances are protein, mineral, and vitamin deficiencies.

The normal infant progressing adequately on the breast requires about 2 to 2.5 grams of protein for each kilogram body weight. Since human milk protein is considered biologically 20 per cent superior to cows' milk protein, it makes the infant's requirement 2.5 to 3 grams of protein per kilogram body weight, which is present in 1½ ounces of cows' milk. Many pediatrists prescribe more than this so there will be no protein want in the diet.

When the protein is below the required level nutritional disturbances develop.

Since the development of the tissues of the body is dependent upon protein ingestion, an insufficiency of the protein content will bring about slow growth, muscles become flabby, secondary anaemia develops, and resistance to infection is decreased. With a prolonged protein deficiency diet there will be the development of oedema due to the decreased blood plasma proteins. The content of iron in cows' milk is lower than in human milk and is less assimilable. Therefore, a greater need of iron is required to be added to the diet to prevent iron deficiency or nutritional anaemia. Iron can be added to the diet in an inorganic state as ferrous sulphate or in medium of egg yolk. The latter not only contains iron, but also pigment which helps to build up hemoglobin, giving it an added advantage over inorganic iron. Egg yolk is usually added to the diet during the third month of life.

There is plenty of calcium and phosphorus in an infant's diet when he is given the generally prescribed amount of milk, but it is not readily assimilated unless there is sufficient vitamin D present.

The absorption of the calcium from the intestines and deposition into the bones is dependent upon vitamin D. Lack of sufficient vitamin D will bring about the picture of rickets, a disease of infants and children consisting of a disturbance of calcium and phosphorus metabolism, which prevents the normal deposition of calcium salts in the growing parts of the skeleton. The skeleton becomes weak, unable to withstand stress and strain to which it is ordinarily subjected, yields and deforms.

These disturbances can always be improved, or if not too far advanced, corrected by adequate doses of vitamin D which is found concentrated in the fish liver oils.

Tetany is another condition found in infants and

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small children. It is produced by lack of sufficient calcium in the blood stream. The addition of calcium alone to the diet will not remove the symptoms but there must also be sufficient vitamin D present. Tetany is always accompanied by rickets but not *vice versa*. The symptoms of tetany are due to a state of increased excitability of the nervous system. In the young infant, tetany is characterized by convulsions or may have symptoms of laryngospasm fairly marked at times or only present when it cries. In older infants carpopedal spasm is more commonly found. Other signs such as Chvostek, Trousseau, Erb and Peroneal demonstrate increased irritability of the nerves.

Such symptoms as redness of the conjunctivae with irritation and swelling of the eyelids, with the patient complaining that the eyes feel as if they are full of sand, may indicate early xerophthalmia, a condition due to vitamin A deficiency. If the deficiency is not relieved, the cornea will first become cloudy, to be followed by necrosis and ulceration resulting in blindness.

A dry and scaly skin condition consisting of a metaplasia and hyperkeratinization of the epithelium with atrophy of the pilosebaceous glands has been attributed to vitamin A deficiency.

Night blindness or nyctalopia has been recognized to be due to vitamin A deficiency. Jeans thinks that, from the results obtained through the use of the photometer, a fairly large percentage of children are suffering from some vitamin A deficiency.

The vitamin C deficiency disease, scurvy, when advanced shows hemorrhages in the epiphyseal end of the bone, between the periosteum and the bone, in the skin or from the orifices of the body. Advanced scurvy is quite rare as the disease is well known and vitamin C will prevent or cure it.

The symptoms of the early or preclinical stage of scurvy are not so definite. However, such symptoms as loss of appetite, failure to gain in weight, irritableness, difficulty to please, vague symptoms often attributed to teething, apprehensiveness to an approach, tenderness of legs, crying a great deal, possible swollen gums along with a history of vitamin C deficiency, give a suspicion of scurvy. The diagnosis can be made definitely by examining the blood for the vitamin C content.

Early or preclinical scurvy is more prevalent than it is recognized. During the recent poliomyelitis epidemic, four cases were referred to the hospital with the diagnosis of poliomyelitis which turned out to be proven cases of scurvy.

The symptoms of anorexia, failure to gain weight or the losing of weight, restlessness, fretfulness, irritableness, and an apathetic attitude have been attributed at times to vitamin B_1 or thiamine chloride deficiency and relief has been obtained through drug administration or diet.

Definite symptoms of beri-beri with paralysis, oedema, and cardiac disturbances are very rare in the practice of pediatrics.

Riboflavin or vitamin B_2 deficiency may occur in the diet. Perleche, ulceration at the angles of the mouth, or what is now described as cheilosis, has been shown to be due to riboflavin deficiency and has been noticed in children. Other symptoms such as changes in the mucous membranes of the mouth and areas of seborrhea in the folds of the skin may be present.

The sudden appearance of an erythema, sharply defined even though mild and resembling sunburn, appearing on the dorsal surface of the feet, ankles, and distal ends of the lower legs and on the dorsal surface of the hands, wrists, and distal surfaces of the lower arms, suggests the diagnosis of pellagra, even though constitutional symptoms are lacking. The deficiency of niacin in the diet will bring about these changes and, unless the diet is improved to contain niacin or the pellagra preventive vitamin, the symptoms will become aggravated.

These nutritional deficiencies which have just been superficially reviewed, occur frequently enough in obstetrical and pediatric practice as to warrant supervision of the patient's diet by the practicing physician.

Nutrition In Preventive and Industrial Medicine

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Nutrition as a factor in the prevention of disease and its relation to medicine in industry has failed to receive the attention which it rightfully deserves. Malnutrition is one of the outstanding problems in public health and preventive medicine today. Unfortunately, it is not always recognized as such, mainly for the reason that we do not know the extent of the disabling effects of malnutrition either from the physical or economic standpoint. Again, many cases of the deficiency diseases are not recognized as such by the physician. Unless physicians recognize the place nutrition has in the prevention of disease, as well as its place in the cure of disease, continued progress in this field cannot continue. A real challenge in this respect exists.

It long has been recognized that various types of malnutrition exist. We may roughly classify two types: first, that caused by a lack of the essential food elements; and second, that caused by other factors and conditions, such as physical exertion, organic disease, pregnancy, chronic alcoholism, and others. Some very interesting information has been obtained from a number of surveys made in Virginia in an endeavor to obtain knowledge as to food consumption in respect to the essential food elements. I mention three of these briefly: A survey was made of the food selected at the lunch counters in a number of Virginia industries. Less than one-fourth of the employees observed selected a lunch which could be rated as good. Only one industrial plant cafeteria came anywhere near giving them one-third the day's food needs. It may be of interest to note that the men selected better diets than the women. Surveys made in the schools of the State show that only a small percentage of the pupils are getting the amount of milk, eggs, fruits and vegetables recommended by the National Research Council. Definite riboflavin deficiencies were observed recently on a dairy farm in one of the most prosperous counties of the State. Distinctive cases of pellagra occur quite frequently.

Such deficiency diseases are, of course, quite easily recognized. There are, however, many deficiencies existing, either alone or in conjuction with other diseases, which are not always recognized. The chief concern probably is the types of subclinical vitamin-mineral deficiencies which frequently elude diagnosis. The patient may simply be called a neurasthenic or such term applied as "inadequate personality". It is possible for subacute deficiencies to exist even when a person shows no gross signs of ill health. Visual acuity, mental health, and morale may be impaired by nutritional deficiency. It is quite well known that a lack of certain dietary factors may cause increased susceptibility to infections.

SYMPTOMS AND SIGNS SUGGESTIVE OF EARLY DEFICIENCY CONDITIONS IN INFANTS AND CHILDREN

SYMPTOMS

1. Lack of appetite.
2. Failure to eat adequate breakfast.
3. Failure to gain steadily in weight.
4. Late period of sitting, standing, walking.
5. Aversion to normal play.
6. Chronic diarrhea.
7. Inability to sit.
8. Pain on sitting and standing.
9. Poor sleeping habits.
10. Repeated respiratory infections.
11. Backwardness in school.
12. Abnormal intolerance of light, photophobia.
13. Abnormal discharge of tears.

PHYSICAL SIGNS

1. Lack of subcutaneous fat.
2. Wrinkling of skin on light stroking.
3. Poor muscle tone.
4. Pallor.
5. Rough Skin (toad skin).
6. Hemorrhage of newborn.
7. Bad posture.
8. Nasal blackheads and whiteheads.
9. Sores at angles of mouth, cheilosis.
10. Rapid heart.
11. Red tongue.
12. Square head, wrists enlarged, rib beading.
13. Vincent's angina, thrust.
14. Serious dental abnormalities.
15. Corneal and conjunctival charges—slit lamp.

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SYMPTOMS AND SIGNS SUGGESTIVE OF EARLY DEFICIENCY CONDITIONS IN ADOLESCENTS AND ADULTS

SYMPTOMS

1. Lack of appetite.
2. Lassitude and chronic fatigue.
3. Loss of weight.
4. Lack of mental application.
5. Loss of strength.
6. History of sore mouth or tongue.
7. Chronic diarrhea.
8. Nervousness and irritability.
9. Burning, prickling of skin, paresthesias.
10. Night blindness.
11. Abnormal intolerance of light, photophobia.
12. Burning or itching of eyes.
13. Abnormal discharge of tears, lacrimation.
14. Muscle and joint pains, muscle cramps.
15. Sore bleeding gums.
16. Tendency to bleed.

PHYSICAL SIGNS

1. Nasolabial sebaceous plugs.
2. Sores at corners of mouth, cheilosis.
3. Vincent's angina.
4. Minimal changes in tongue color or texture.
5. Red swollen lingual papillae.
6. Plossitis.
7. Papillary atrophy of tongue.
8. Stomatitis.
9. Spongy, bleeding gums.
10. Muscle tenderness, extremities.
11. Poor muscle tone.
12. Loss of vibratory sensation.
13. Increase or decrease of tendon reflexes.
14. Hyperesthesia of skin.
15. Bilateral symmetrical dermatitis.
16. Purpura.
17. Dermatitis; facial butterfly, casual necklace, perineal, scrotal, vulval.
18. Thickening and pigmentation of skin over prominences.
19. Nonspecific vaginitis.
20. Follicular hyperkeratosis of extensor surfaces of extremities.
21. Rachitic chest deformity.
22. Anemia not responding to iron.
23. Fatigue of accommodation.
24. Vascularization of cornea.
25. Conjunctival changes.

Characteristic effects of a deficiency of vitamin A may develop rather slowly—conjunctival thickening and pigmentation, and hyperkeratosis follicularis.

An insufficient amount of the vitamin B complex may show up first by loss of appetite, increased fatigability and disturbances characteristic of the psychoneuroses. The tongue may become swollen and red, followed by diffuse glossitis and ulceration. This may be accompanied by fissures and cheilosis.

The manifestations of vitamin C (ascorbic acid) deficiencies may consist of slight swelling, and blood oozing between the teeth at slight pressure. Later manifestations are swollen gums consisting of bags of blood. Continuation of this condition causes a break in contact between the gums and teeth, with consequent collections of tartar on the teeth below the gum margins. During the progress of these conditions involvement of the alveolar processes occurs which causes loosening of the teeth.

Many lesions involving the eyes, mouth, skin, mucous membranes, and nervous system have been shown to have a nutritional deficiency basis.

Very often nutritional deficiencies are present with other diseases. In a recent study at the Charity Hospital, New Orleans, 67 per cent of the 200 patients examined showed clinical manifestations of an insufficient supply of riboflavin and niacin. Signs of deficiency diseases were present in all persons with hyper-thyroidism, cirrhosis of the liver, and chronic alcoholism, and in two-thirds or more of the patients who had infections, diabetes mellitus, carcinoma, and diseases of the gastrointestinal tract. This may be easily understood when one realizes such diseases interfere with the ingestion and assimilation of food.

Not only should we think in terms of vitamin deficiencies, but of the minerals. Iodine deficiency is well known and probably generally recognized. The widespread prevalence of constipation may be in part due to the low mineral content of refined cereals and sugar.

Tooth decay is a menace to health and may be considered among our leading "diseases". Tooth structure may be definitely influenced by proper and adequate nutrition during the prenatal period. "The proper time to prevent deficiencies is not after the child is born, but before or immediately after the beginning of pregnancy."

Manganese is one of the trace elements essential to production of viable young animals, and probably has somewhat the same importance in human nutrition.

In studies of large groups, the prevalence of hypochromatic anemia is a reasonably accurate index of a dietary inadequacy of iron. Inadequacy of other nutrients, as thiamin or other members of the B complex, may also result in anemia of this type.

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That nutritional deficiency will result in a lowered resistance to infection goes without saying. The presence of any infection increases the need of the body for many of the food elements. The amount of vitamins A and C in the blood is lowered markedly by infection, and there is some evidence of increased need for vitamin B_1.

Unfortunately, many of our therapeutic diets (as restricted diets for ulcer, diabetes, obesity and allergy diets) have led to nutritional deficiencies. This should be carefully guarded against by the physician.

Industrial workers have long been the object of special attention as concerns research in the field of nutrition. Certain groups of workers probably need special diets. It is quite generally recognized that men working in high temperatures need not only more food, but an extra supply of sodium chloride to replace that lost through perspiration. Failure to maintain NaCl level of blood will result in heat exhaustion.

Clinically, it is recognized that a diet adequate under normal conditions may be inadequate when disease is present, or under abnormal conditions. What has not been recognized is that many people in their work are exposed to toxic agents and other environmental conditions which are not normal. Certain of these toxic agents lose their toxic effects when the diet is modified. The effective protection against toxic agents by adequate and proper dietary changes has been demonstrated time and time again.

Treatment of trinitrotoluene poisoning has included a high carbohydrate, low-fat diet with additional vitamin B complex and vitamin C and additional protein. English clinical investigators have recognized the possible role of high protein intake in liver protection against damages caused by certain toxic agents. It is known that lead workers need large amounts of calcium, preferably in the form of milk, to remove lead from the blood stream.

Limited data available indicate small losses of vitamin C, thiamin, niacin, riboflavin and pantothenic acid with prolonged sweating. It is probably not sufficient to affect adversely an individual whose dietary intake is adequate, but may be a consideration if the diet were consistently below adequacy. Therefore, it would seem wise to be sure of an excess of these factors in the diet in the case of industrial workers in high temperatures or under continuing physical exertion.

Many studies have been made of the effects on physical performance of a diet deficient in vitamin B complex. These show that subjects engaged in hard physical labor suffer from easy fatigue, irritability, lack of energy, anorexia, muscular and joint soreness, as well as loss of ambition, when deprived of the B group of vitamins.

It is reasonable to suppose that shift work, irregular meals, meals consisting of doughnuts and coffee, or soft drinks and pastry, must have an adverse effect upon the health of the American worker. When inadequate diets are brought up to adequate levels in industrial plants, we should expect greater working efficiency, fewer absences from work, and a decrease in the number of accidents. Steady nerves and good vision are two important requisites for any worker to prevent industrial hazards. Changes in occupation, especially those that require more concentration and exertion, impose a strain on the human organism. A change in habits and hours of work will naturally also impose additional strain.

It must be remembered that speed-up of work, insufficient rest and other conditions of metabolic stress produce an increase in the body's nutritional requirements. Employees working at very high temperatures, for example, consume much larger quantities of food than those working at lower temperatures.

It is difficult to tell how closely the various occupational diseases may be tied in with nutritional deficiencies. There is little evidence available indicating the true relationship between "hidden hunger" and the incidence of sickness, absences and accidents, although that which does exist is positive in character. Sir John Boyd Orr, in an article "Trends in Nutrition" in the January 18, 1941, issue of the *British Medical Journal*, states: "The improvement of the diet of workmen whose diet was not previously up to the standard for health is followed by increased output without any conscious increased effort, and also by a reduction in the number of accidents."

According to a report by Brundage, Reprint 1765, *Public Health Reports*, August 21, 1936, persons in ill health are prone to accident, as shown by the findings that those who have the most accidents are those who pay the most visits to the medical department. Still other reports also show that those who have poor health records have poor safety records.

In the Servel plant, after a nutrition program was

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carried out for four months, absenteeism had dropped 17 per cent. In another plant in Seattle, Washington, where labor turnover and absenteeism were high, the installation of a modern cafeteria brought labor turnover down from 12.5 per cent to 5.9 per cent in six months, and absenteeism from 9 per cent to 4.1 per cent.

Fewer absences from respiratory diseases and high production records in one shipyard are credited to the good food service maintained.

Dr. Tom Spies has recently reported on the successful nutrition rehabilitation of 100 men previously unable to work because of nutritional deficiencies.

The U. S. Public Health Service has been collecting information for some time on the frequency of sickness causing disability among 200,000 male industrial workers. These show that sickness from respiratory diseases constitutes 42 per cent of the total illness, while digestive diseases account for 13.5 per cent. Both of these are at least related to food habits.

The giving of a supplementary feeding in some industrial plants has resulted in the workers being less tired, in better spirits, and more attentive to their work.

The diagnosis of one clinical syndrome denoting nutritional failure necessitates a thorough search for others. Many undernourished people may never develop clinical signs of deficiencies.

Let us assume that a person may have a nutritional deficiency for years before it is detected. It may show up as such or through some other disease. The best practice, then, is to teach good nutrition—a wholesome well-rounded diet—to all of our patients as good preventive medicine, rather than wait for these deficiencies to show up.

Selecting foods wisely is not enough. Food values are diminished by storage, cooking and other processes. For instance, in one study it was found the loss of vitamin C from apples was 91 per cent if made into applesauce or apple pie, or 80 per cent if the apples were fried. The thiamin loss in apples was 20 per cent just in storing for 12 weeks. As much as 43 per cent of the thiamin present in roast pork may be destroyed in the roasting process.

Mackie says: "It is the responsibility of the physician to inform himself concerning specifc nutritional requirements and to be competent to instruct the layman in lay terminology and household weights and measures. The responsibility of the medical profession is far wider than the mere recognition and treatment of the clinical manifestations of nutritional failure."

The recognition by the physician of the nutritional deficiency diseases and the knowledge of the effect of nutrition on diseases cannot be over emphasized. Yet this is not enough. This knowledge must be applied in the prevention of disease, whenever and wherever effective results can be obtained.

Conclusion

JOHN B. YOUMANS, COLONEL, M.C.

We have heard a discussion of nutrition and nutrional deficiency disease as it concerns the various phases of medical practice. I should like to recall to you the emphasis which was placed on nutrition as compared with nutritional deficiency disease in the generally accepted sense. There was little said of pellagra, or beri-beri, or scurvy per se, but much about nutrition and its relation and effect on other disease, its effect on the incidence of disease, on the course and complications and on convalescence and recovery.

Such a relationship imposes a number of problems and objectives of both a practical and a theoretical nature. One set of problems and objectives is the further study of these relationships so that a better understanding is had of their nature, their extent and their mechanism. Why, for example, should such an operation as an appendectomy cause a greater negative nitrogen balance than a herniorrhaphy? What is the source of the nitrogen lost following a fracture of the femur? What, if any is the role of vitamins in the loss of weight and atrophy that follow trauma and infection? How far should we go in attempting to combat loss of nitrogen and loss of weight by forced administration of food, by oral or other routes, to the extent of 200-300 grams of protein and as much as 10,000 calories? What foods are protective against the noxious agents of infection?

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Another set of problems are those concerned with the diagnosis of the nutritional deficiency disease in the population and in our patients. Reference has been made this afternoon to a study of the incidence of one nutritional deficiency, namely, protein deficiency. Data on the incidence of other deficiencies are desirable if we are to know the nutritional background of our patients and the possible liability and complication of a nutritional deficiency disease. Furthermore, it will be desirable to know not only that nutritional deficiency exists, if any, but the kind that is present, because such knowledge may forewarn us as of the effect to expect and the methods to be taken for their prevention and relief.

Any attempt to determine the incidence of deficiency disease is dependent on methods of detection or diagnosis. In the earliest or slightest degrees of a deficiency the symptoms in individual cases are as yet not recognizable though they may be suspected from a knowledge of the dietary and non-specific effects referred to in my opening remarks.

In a slightly more severe form or advanced stage signs or symptoms of the deficiency begin to raise themselves above the horizon though but slightly. Though not pathognomonic nor even highly specific, such signs and symptoms as papular, perifollicular hyperkeratosis, corneal vascularization, cheilosis, angular fissures of the mouth, glossitis and gingivitis, suggestive dermatitis of exposed areas, dental caries, significantly altered reflexes, muscular weakness of the extremities, sensory disturbances and otherwise unexplained edema, may be and often are manifestations of nutritional deficiency disease. Similarly various symptoms, though often lacking specificity, are indicative of an actual nutritional deficiency and call the attention of the alert physician to a possibility which must be carefully investigated.

Besides these symptoms and physical signs of deficiency states, there are laboratory tests which will reveal the presence of actual damage or disease resulting from a deficiency, even before the physical evidence mentioned above occurs. At present fairly satisfactory laboratory tests are available for the following deficiency diseases: Vitamin A deficiency, thiamin, riboflavin, niacin and ascorbic acid deficiency, Vitamin D and K deficiencies, protein deficiency and deficiencies of calcium and iron. Of such laboratory tests among the commonest used are the x-ray for Vitamin D and calcium deficiency, examination of the blood for the anemia of iron deficiency and the various prothrombin tests for a deficiency of Vitamin K. Very simple tests are now available for total serum protein. By the technique of Van Slyke one can quite simply and accurately determine the total serum protein, hemoglobin and hematocrit in a minute or two by dropping a drop of blood in a copper sulfate solution to determine its specific gravity. Tests of the concentration in the blood or the excretion in the urine of Vitamins A and C, and of thiamin and riboflavin, are within the capability of any good hospital laboratory. An alternative test for Vitamin A deficiency is the test for night blindness with an adaptometer. Although these tests are not without their limitations, they are valuable when properly used and interpreted and are particularly applicable to individual patients because of the opportunity to repeat them and to control them with the history, physical examination and a critical therapeutic trial.

Recognizing that nutritional deficiency disease exists in a mild and even sub-clinical form it is important to determine if possible how common it is, the relative incidence of deficiencies of the various nutrients and the degree and manner in which different elements of populations such as children, pregnant and nursing women, workers in special industries, and other groups are affected. It is clear that for the sub-clinical deficiency states this can be distinguished only by inference. In the past such information has been obtained mainly by dietary and food consumption records. Though, valuable, particularly with respect to the etiologic aspects of deficiencies, this method does not give as reliable evidence of the existence of actual deficiency states as objective signs, symptoms and positive laboratory tests. Such dietary studies are the basis for reports of nutritional deficiencies in high percentages of people in this country. Some doubt has been expressed whether deficiencies are actually as numerous as indicated by such studies. However, by detecting the cases of hypoclinical deficiency through the use of the laboratory test and clinical signs just described a better idea of their number and frequency can be gotten. If the number with laboratory or early clinical evidence of a given deficiency is known one can form some idea of the number who probably have a deficiency too mild to give such evidence yet serious enough perhaps to cause some alterations in function or structure.

In the last few years a number of surveys of

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nutrition of populations have been made using the objective methods described above, physical findings and laboratory tests. Such surveys give evidence of the kind and frequency of mild nutritional deficiency in various groups of the population and it is interesting and valuable to compare such evidence with the results of dietary surveys. Some of the results of such a survey, an assessment of the nutrition of a general population of some 1,200 persons in rural Tennessee, are shown in accompanying tables. As can be seen there is a great difference between the incidence of deficiency disease as established by various methods. (Tables 1-4.) Furthermore, this difference in turn varies somewhat with the particular nutritive factor under consideration.

TABLE 1

THE INCIDENCE OF PROTEIN DEFICIENCY IN A GENERAL POPULATION (APPROX. 1,200 SUBJECTS)

KIND OF EVIDENCE	INCIDENCE PER CENT
1. Dietary Intake Record	
Total Protein Intake < 50 Gms.	45.5
Annual Protein Intake < 20 Gms.	47.0
2. Physical Examination	
Edema Attributable to Protein Deficiency	0.9
3. Laboratory	
Hypoalbuminemia	9.0

TABLE 2

THE INCIDENCE OF VITAMIN A DEFICIENCY IN A GENERAL POPULATION (APPROX. 1,200 SUBJECTS)

KIND OF EVIDENCE	INCIDENCE PER CENT
1. Dietary Intake Record	48.5
2. Night Blindness (History)	5.5
3. Dermatosis	3.0
4. Lesions of the Sclerae	5.0
5. Adaptometer (Night Blindness) Tests	47.4
6. Blood Vitamin A Concentration	27.7

TABLE 3

THE INCIDENCE OF CALCIUM DEFICIENCY IN A GENERAL POPULATION (APPROX. 1,200 SUBJECTS)

KIND OF EVIDENCE	INCIDENCE PER CENT
1. Dietary Intake Record	74.0
2. Symptoms and Signs	00.4
3. Blood Calcium Concentration	1.8

TABLE 4

THE INCIDENCE OF VITAMIN C DEFICIENCY IN A GENERAL POPULATION (APPROX. 1,200 SUBJECTS)

KIND OF EVIDENCE	INCIDENCE PER CENT
1. Dietary Intake Record	61.0
2. Physical Examination Gingivitis	28.0
3. Blood Vitamin C Concentration	8.6

These rather wide differences are the result of several factors. Dietary studies, as indicated, above are predictive and except at extreme grades of deficient intake cannot be expected to determine accurately the presence or degree of deficiency disease. Also, as stated above, the signs and symptoms of slight or early deficiency are lacking in specificity. Many of such signs and symptoms have several causes and even rather careful examination cannot distinguish with certainty between them. Furthermore, the time necessary to produce, or permit the disappearance of, such signs makes close correlation between physical signs and dietary intake unlikely unless the latter observations are continued over impractically long periods.

The laboratory tests may offer more reliable evidence of the early deficiency lesions despite some differences of opinion regarding the significance and interpretations of some of the tests, but again correlation between the results of such tests are clearly shown in Table 5. There is shown, for example, a striking difference in the frequency of Vitamin A deficiency between white and colored children of certain age groups. At the same time, there is a similar difference between white males and females of a single age group (13-15) and a difference almost as great between white male and female adults. Colored children show a great decrease in frequency at ages 4-6 compared with 1-3 while white children show what appears to be a significant increase. In neither white nor colored groups does the average incidence for the entire group adequately express the different frequencies in the various sub-groups.

It is clear that if nutritional deficiency disease exists to the extent which appears from this and other data and if it contributes an important hazard to health and particularly in relation to the occurrence and the outcome and recovery of other disease it is important that all possible means be taken for its prevention and relief. Some of these procedures have been described this afternoon by other speakers.

In general, prevention is accomplished by an adequate, varied diet of usual foods. The nature of such a diet is well known and the difficulties with its use are based on economic factors, faulty food habits, idiosyncrasies and ignorance. There are, however, effects of storage, preservation, cooking, preparation and serving which may at times seriously interfere with the nutritional adequacy of an

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otherwise adequate dietary. When these factors are controlled through education, improved social and economic status and technological advance, much of the backlog of low grade nutritional deficiency in a population will disappear.

There are, however, certain groups of people who are especially liable to deficiency disease. They need protective treatment. It is this group which is of particular interest and importance to the practicing physician because not only do the deficiencies present special problems of their own, but as I have said above, and as we have learned today from the other speakers, they influence other diseases and complicate many situations with which the physisian must deal. The group needing protective treatment is large and includes such persons as infants, especially the premature, pregnant and nursing women, those with disease interfering with the intake and utilization of food, notably those with gastrointestinal disease, those on special therapeutic diets, those with metabolic diseases leading to increased nutrition requirements, those suffering the results of trauma and operation and those requiring operation. It includes also some exposed to special occupational hazards, such as night workers and workers in special industries. Such a list, though not complete, will illustrate the wide range of conditions which are included in the group needing special protection and the importance of the groups to the practicing physician. In each case the particular needs should be determined and a particular effort made to protect against deficiency of that factor which it appears is likely to be deficient.

In many instances such protective treatment can be given to best advantage by the use of added amounts of extra natural food. For example, an extra supply of Vitamin C to an infant, or to a patient with tuberculosis, is better provided by a proper fresh fruit drink than by the synthetic vitamins. In some instances, however, this will not be enough and it will be necessary to use more drastic means to increase the intake of adequate amounts of proper nutrients. This may involve parenteral feeding, tube feeding or intravenous feeding, and the use of food concentrates or even special preparation of vitamins, protein and minerals. Some of the more energetic measures have been described by Dr. Evans this afternoon.

When such protective treatment is not provided in advance of the occurrence of an actual deficiency and a deficiency occurs, curative treatment is, of course, indicated. For the grade of deficiency under discussion cure can usually be accomplished by proper kinds and added amounts of usual foods with particular attention to those specially indicated. Thus, protein can be supplied as meat, including viscera; eggs, milk and cheese and other protein rich foods and such a form of treatment is to be preferred. Sometimes, however, concentrates and pure preparations may be necessary, but even they should whenever possible be accomplished by a liberal varied diet.

TABLE 5

VARIATIONS IN THE INCIDENCE OF A NUTRITION DEFICIENCY (VITAMIN A) IN AGE, SEX AND RACIAL GROUPS

PER CENT DEFICIENT	AGE AND SEX										
	1-3* M & F†	4-6 M & F	7-9 M & F	10-12 M & F	13-15 M	13-15 F	16-20 M	16-20 F	21 M	21 F	TOTAL
White Subjects	64.3	89.5	61.3	42.3	14.3	45.4	30.8	38.5	12.1	25.5	32.7
Colored Subjects	66.7	16.7	8.3	8.3	0	12.5	0	16.7	12.5	17.2	14.6

*Years. †M—Males, F—Females.

SUMMARY

To summarize, we have attempted to show the basic and important relation of nutrition to health and disease and to clinical medicine particularly. Without intending to minimize the significance and importance of nutritional deficiency in the sense of specific deficiency disease we have sought to emphasize that nutrition and nutritional deficiency have a larger meaning, through their effect on other illnesses and diseases and the patient's response to and recovery from such illness and disease. The need for further knowledge of the relation between nutrition and health, especially under the impact of other disease, has been indicated. Data has been given on the amount and kind of nutritional deficiency which may exist in a general population and constitute a hazard and a complication to patients who are affected by other illness or disease, and methods for the diagnosis and detection of such deficiencies have been described. The practical application of measures for prevention and control have been presented and discussed.

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CHAIRMAN HIGGINS: I am sure there are some who would like to ask some questions of Colonel Youmans and the other gentlemen who spoke in the symposium this afternoon. If you have some questions we shall be very glad to hear from you.

If there are no questions, I am sure I am speaking for the Medical Society of Virginia in telling Colonel Youmans that this symposium has been the high water mark of this convention and that his leadership in this subject is something which has brought out factors which we shall carry home with us to great profit and that we shall look back to his short time with us with a great deal of satisfaction.

I should like to say to Colonel Youmans that I have talked to a great many members of the armed forces, including my own sons, and I have yet to find one who has not spoken with a great deal of esteem of the diets that have been supplied for them, whether in the camps, on ships, or elsewhere; and I should like to extend thanks to Colonel Youmans for his help in upholding our soldiers and keeping them in a high state of health.

Those With Lung Ailment Should See Doctor Before Traveling by Plane.

Persons suffering from known diseases of the lungs should consult their physicians before traveling by plane, Lieutenant Commander Harold Vincent Holter, MC-V(S), U.S.N.R., and Lieutenant Orville Horwitz, MC-V(S), U.S.N.R., advise in *The Journal of the American Medical Association* for March 3.

They cite an instance where a young marine reported to the medical unit after his first airplane flight complaining of pains in his chest. Examination revealed about a 60 per cent collapse of the right lung. They believe that the cause of this condition was the change of atmospheric pressure produced by ascent to 8,000 feet in an airplane. They say their report on this case may assist other physicians in advising their patients in this respect.

It has lately been reported that patients with lung injuries may be transported by air, at low altitudes, without danger. However, in these cases, a tear in the lung is known to exist, and no further damage may be expected. "In contrast to these individuals," the two physicians say, "is the one reported in which the tear did not already exist, but is merely a potential weakness which may be converted into a full tear by means of decreased atmospheric pressure.

"Although no definite conclusion may be drawn from this particular case, it is our considered opinion that extreme caution should be exercised in advising patients who have had the known diseases of the pleura [the membrane that surrounds the lung and lines the chest] about airplane travel."

New Books.

Recent additions to the Library of the Medical College of Virginia include the following, which are available to our readers under usual library rules:

Ashman & Hull—Essentials of electro-cardiography for the student and practitioner of medicine.

Bauer, W. W.—Contagious diseases.

Best, Harry—The deaf and deafness.

Boyd—Textbook of pathology.

Brenman—Hypnotherapy.

Carter—Fundamentals of electro-cardiographic interpretation.

Cole & Puestow—First aid, surgical and medical.

DeLee's Obstetrics for nurses.

Feinberg—Allergy in practice.

Flag, P. J.—The art of resuscitation.

Fruton, Jos. S. Ball, Bergmann—Energy relationship in enzyme reactions.

Hall, I. Simson—Diseases of the nose, throat and ear. 1944.

Harley, D.—Medico-legal blood group. Determination: Theory, Technique, practice.

Henry, R. J.—The mode of action of sulfonamides.

Landon—Anna and the King of Siam.

Orr, T. G.—Operations of general surgery.

Padgett—Skin grafting.

Rapaport, D.—Manual of diagnostic psychological testing. 1. Diagnostic testing of intelligence and concept formation.

Spurling—Practical neurological diagnosis.

Stern, B. J.—American medical practice in the perspectives of a century.

Weisenburg, T. & McBride, K.—Aphasia.

Year Book of Pediatrics—1944.

Year Book of Urology—1944.

SUPPRESSIVE TREATMENT OF MALARIA DURING COMBAT OPERATIONS*

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Much has appeared in the literature of recent years on the subject of malaria and particularly on military malaria control.[1,2,3] Several excellent textbooks cover the subject of malaria control quite adequately.[4,5,6] Were it possible to operate under ideal conditions in a theater of war, many of the fine outlines and suggestions offered by these authors could be carried out to the satisfaction of all concerned. Our limited experience with malaria in World War I, plus the inadequate training in tropical medicine afforded by most of the medical schools, left us ill-equipped to face such a formidable problem as World War II malarial problem has turned out to be. The fact that we are using the synthetic anti-malarial drugs as suppressive therapy under combat conditions for the first time has presented many problems, some of which were experienced in the Mediterranean theatre during 1943. That these same problems might not repeat themselves in the future prompts the authors to recount some of the pitfalls observed in carrying out an effective suppressive therapy program in North Africa 1942-1943.

PROPHYLACTIC TREATMENT OR SUPPRESSIVE THERAPY

It is acknowledged that in combat zones the first aim is to keep all personnel effective. This applies equally to support and supply troops as well as to those soldiers actually engaged in combat, and it is important that all troops in a combat area in which malaria is endemic observe rigid malaria discipline.

Russell[1] defines malaria discipline as "a state of orderly and effective conduct or action on the part of soldiers in respect to malaria control". One of the most important items in malaria control is suppressive therapy and that might be given the name of "atabrine discipline".

If the soldier can appreciate the fact that his safety in combat depends in large measure on his physical well-being, he is more apt to be concerned with his suppressive therapy. Irregular doses of atabrine may permit atypical symptoms to "breakthrough" and render the soldier slightly "under par" in his reaction time and his ability to move quickly to avoid enemy fire.

It is not intended that suppressive therapy take the place of other measures directed at mosquito control. Protection against adult mosquitoes, and control of mosquito larvae as well as individual measures such as the use of sleeping nets, repellents and protective clothing are to be used to the fullest extent in conjunction with suppressive therapy.

Many soldiers fail to appreciate that atabrine in suppressive doses does not protect them from malaria, but simply postpones the attack. Thus, the soldier who is properly "educated" in malaria control understands that the individual measures used against malaria are adjuvants and are independent. No single individual measure will protect with certainty against malaria but all measures used in combination will, in a very large percentage of cases, be effective.

DANGERS FROM INADEQUATE BLOOD LEVELS

Suppressive therapy can be potentially dangerous if taken irregularly. Inadequate blood levels of suppressive atabrine due either to irregular administration or ineffectual dosage may result in atypical symptomatology. In these atypical cases, clinical as well as laboratory diagnoses are difficult.

Many such atypical cases of malaria, many of whom had taken suppressive atabrine irregularly, were seen in North Africa and presented a real problem in diagnoses (see Case Histories 1, 2, 3, 4).

ATYPICAL CASES

Case 1. Malaria—Cerebral Type. Six weeks be-

*This paper has been approved by the Publication Department of the Surgeon General's Office.

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fore admission patient was hospitalized in Bizerte Evacuation Hospital for seven days with complaints of headaches, weakness, dizziness, "blackouts" but no fever or chill. Patient stated that he had taken one or two atabrine tablets a week. Blood smears for malaria were negative. Patient was transferred to a General Hospital where he remained for five days, and was then transferred by hospital ship to Oran, the trip requiring three days. Admitted to Tlemcen Station Hospital where he was studied for thirteen days in a Psychiatric Ward because of severe headaches. Discharged without diagnosis to Replacement Pool where he remained for four days, but was still complaining of severe headaches and weakness. Again admitted to Station Hospital where his RBC were found to be 2,000,000 and smears were positive for plasmodium falciparum. Recovery with quinine.

Case 2. Malaria—Pulmonary Type. This patient had been on two or three atabrine tablets per week for several weeks prior to his admission with generalized aches, headache, cough productive of thin sputum, chills and fever. X-rays showed evidence of patchy infiltration at one base with diagnosis of primary atypical pneumonia. Blood smear positive for plasmodium falciparum. RBC 3,650,000, WBC 6,200. Recovery with quinine.

Case 3. Malaria—Gastro-Intestinal Type. Patient had taken atabrine regularly for several weeks up until about three weeks before admission at which time he took only one or two pills a week. He was admitted with a two weeks' history of abdominal cramps and diarrhea, but no chills or fever. Stool culture negative; blood culture negative. Agglutinations for brucella, typhoid, paratyphoid negative. Blood smear positive for plasmodium falciparum. Recovery with quinine.

Case 4. Malaria—Myalgic Type. This patient gave a history of having taken atabrine irregularly for several weeks and was admitted with generalized muscular aches and pains, but no chills or fever. On examination, there was tenderness of all muscles and joints but no redness, heat or swelling. Active or passive joint motion was painful. Blood smear positive for plasmodium falciparum. Quick response to quinine.

It is absolutely essential that either a commissioned or a non-commissioned officer witness the actual swallowing of the atabrine tablets. Failure to do so results in many malaria casualties. If not actually checked by a list each day some of the soldiers on guard duty, patrol duty, or other duty requiring their absence from the "chow line" will be missed in the suppressive program.

In mid-July, 1943, a group of thirty-seven hospitalized malaria patients were questioned in an effort to determine the cause for the "break-through" of clinical symptoms. From these patients it was learned that:

(1) Twenty-seven had had irregular dosage. Doses ranging from one atabrine tablet a week up to four or five atabrine tablets per week had been taken by soldiers in this group. Many reasons were given for the irregular dosage. Some of the soldiers stated that the pills were distributed by the non-commissioned or commissioned officer at irregular intervals. Others placed the pills in their pockets with the intention of taking them later, only to have the pills disintegrate from pressure or body moisture.

(2) Twelve had no supervision of the actual swallowing of the drug. In many instances neither a commissioned or non-commissioned officer witnessed the actual swallowing of the pill. In other cases the pills were handed to the soldiers under supervision of an officer but it was left to the soldiers' responsibility to actually ingest the pill.

(3) Thirteen failed to take their atabrine because they were away from the source of supply for a period of time while on patrol duty, and other details. No provision was made to provide some of the men who were out on patrol duty with a supply of atabrine to last them during this period of separation from the unit supply.

(4) Three stated that there was no supply of atabrine available for their entire company. Here there was a failure on the part of the person responsible for supply to anticipate the needs in order to take care of the entire unit during a forced march or, as in many cases during the Sicilian invasion, while the men were on ships during amphibious landings.

(5) Four professed an indifference to the program and stated they had thrown away the pills whenever opportunity presented itself. These soldiers stated that they preferred the disease to the gastro-intestinal upset which many of them suffered during the first few days of the suppressive program. Some stated: "When we were ducking lead we did not worry about atabrine."

(6) Only five had received adequate dosage under proper supervision.

SUMMARY

(1) The importance of a thorough, intensified educational program on the subject of malaria control and particularly on atabrine as an effective suppressive drug is stressed.

(2) Failures in suppressive atabrine programme are listed.

(3) Causes for clinical "break-through" are enumerated.

(4) Certain atypical case histories are presented.

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New Books.

The following are recent acquisitions to the library of the Medical College of Virginia and are available to our readers under usual library rules:

Ackerknecht—Malaria in the Upper Mississippi Valley 1760-1900.
Anson, ed.—Advances in protein chemistry. v. 1.
Bailey—Demonstrations of physical signs in clinical surgery.
Balfour—The living soil.
Beveridge—Full employment in a free society.
Collins—The Aleutian Islands: Their people and natural history.
Cressey—Asia's lands and peoples.
Druggists Circular—The modern materia medica. 3rd ed. rev. 1912.
Emerson—Health for the having: A handbook for physical fitness.
Fabricant—The common cold.
Faulkner—Plowman's folly.
Field—Bernard Baruch, Park Bench statesman.
Files—Medical Radiographic technic.
Fishbein, ed.—Medical uses of soap.
Fisher—Internal derangements of the knee-joint.
Francis—Biographical sketches of distinguished living New York Physicians. 1867.
Gershenfeld—Bacteriology and allied subjects.
Gesell—The embryology of behavior. 1945.
Irwin—Young Bess (a novel).
Jaffe—Pathological conferences held at the Cook County Hospital.
Janney—Medical gynecology.
Johnston—World patriots.
Leggett—Ancient and medieval dyes.
Lonn—Salt as a factor in the Confederacy.
Lorand—Psychoanalysis today.
McCracken—Selected physics topics for home economics students.
Massengill—A sketch of medicine and pharmacy.
Mather—Enough and to spare.
Medical uses of soap: A symposium by ten writers.
Perkins—The Emperor's physician.
Samuels—Peripheral vascular diseases (Angiology).
Sharp, ed.—A dynamic era of court psychiatry 1914-1944.
Sigaud—Belle Boyd, Confederate spy. (Novel.)
Stern—American medical practice in the perspectives of a century.
Stokes—Modern clinical syphilology. 3rd ed.
Streeter—The new healing.
Sulzberger & Wolf—Dermatologic therapy in general practice.
Unger—Bronchial asthma.
Watson—Fractures and joint injuries. 3rd ed.
Wilson—The brother.
Wright—Black Boy.
Yearbook of dermatology and syphilology 1944.
Yearbook of general therapeutics 1944.
Yearbook of neurology, psychiatry and endocrinology 1944.

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PENICILLIN THERAPY IN OTITIS EXTERNA*

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Otitis externa is most frequently brought on by direct trauma of the external ear canal, causing an inflammation of the hair follicles and sebaceous glands. The infection is more prone to occur during the bathing season, having greater frequency in persons using fresh water lakes and rivers rather than that of salt water. Following diving in water, the swimmer will, in many instances, endeavor to "unstop" his ear by scratching or probing into it, thus abrading the epithelial surface or traumatizing the sebaceous glands and hair follicles. This, in turn, causes a direct portal for infection. The lack of local hygiene and utilization of blunt instruments in removing cerumen also causes infection but with less frequency.

The pathology[1] of the organism is usually staphylococcus pyogenes. In our patients who frequented fresh water lakes and tidal fresh water rivers, as in Tidewater Virginia, the infection began in 18 of the 62 cases seen by an otomycosis of the Aspergillus type and with a staphylococcus secondary organism. Patients utilizing salt water bathing had no fungus infection and the severity of their staphylococcic infection was not as great as those in this geographic area.

The symptoms of the cases varied in intensity, the earliest one being seen 48 hours after onset and the latest twenty-four days after exposure. There was a lateral bulging of the involved canal, the auricle being slightly forward and angulated outward at its lower portion. Patients had pain in masticating their food, and discomfort on swallowing was made worse if the tympanic membrane was disturbed by the infection. There was some redness and edema about the orifice of the external canal in most cases. Palpation over the pre- and inferior auricular lymph nodes elicited pain and in severe cases edema of the tissues over the mastoid bone was evident. Complete examination of the involved ear canal with an electric otoscope was impossible in 29 of the cases due to the edema of the canal. The external canal was swollen and from two to multiple diffuse furunculosis was present. In the 18 cases showing a mycotic infection, a dirty grayish coating of irregular thickness extended throughout a greater portion of the canal. On removal of the crusts there was a sweetish odor and the fungus showed up under potassium hydroxide, 1 per cent staining. The underlying surface was spotted with furuncules of varying sizes—from 1 mm. to 4 mm. in diameter. The temperature of these cases was from normal to 103.2 F.

A total of 62 cases of otitis externa was seen over a period from June, 1943, to August 4, 1944. Of these, 54 cases were treated with other medication than penicillin. Penicillin was used in nine cases and in two of these cases, that have happened previously, infection was of such severity as to necessitate hospitalization.

Until July 10, 1944, the usual method of treatment was gently cleaning the areas with sterile cotton applicator sufficient to remove the pus present, then use sulfathiazole[2] ointment, cotton tampon and continuous dry external heat. In the mycotic infections cresatin and 1 per cent thymol was used. The average duration of the 36 cases was 11 days for complete recovery. Eighteen cases were hospitalized. Sulfathiazole was given orally in those cases with doubtful results and the average hospitalization was four to five days.

Beginning July 10, 1944, Penicillin,[3,4,5] being the sodium salt in sterile distilled water, was used. A hundred thousand Oxford units were diluted in 20 c.c. and 1 c.c. of the solution added to 19 c.c. of water in a sterile beaker. The external orifice of the infected canal was cleaned with sterile cotton and a dry cotton wick placed in the ear. The patient's head was angulated over so that the infected canal was in an upright position. The solution was dropped from a sterile medicine dropper on the cotton wick until completely saturated. The penicillin solution was dropped in the ear every two hours, from four to eight drops. The penicillin sodium salt was 100,000 Oxford units diluted with 20 c.c. of sterile water to make a solution of 5,000 units per c.c. The usual dose of 20,000 units was given intramuscularly every three hours for the first 48

*Presented at a Staff meeting of the Raiford Clinic, at Franklin, August 16, 1944.

hours. This solution was kept in refrigeration below 50 degrees F.

Six of the cases were hospitalized in order to give the drug, the other two being clinic patients. Two hospital employees were treated in essentially the same manner except that they continued their normal activities.

The average hospitalization was 2.2 days with a relief of symptoms in the first 12 to 18 hours. Of the six patients hospitalized, two had had previous infections, one in 1942 and one in 1943, being 6 and 8 days, respectively, in the hospital, and with a recovery time of eleven days.

A report in detail of five of the nine cases is included, the remaining four being similar to these rendered.

1. R. W. J., male, white, age 14. Furunculosis of 8 days' duration of left external ear canal; T. 102.6. Anterior lateral bulging of auricle. Pain on palpation of pre- and inferior auricular lymph nodes, discomfort in the mastoids but no evidence of infection. The canal was swollen to a slit like opening with numerous minute staphylococcic furuncles, and there was inability to masticate food on the left side. Penicillin solution was applied, as stated previously, 20,000 units of penicillin being given intramuscularly every three hours for 42 hours. A total of 280,000 units was given. Acetophenetidin 0.25 gm. was given every three hours p.r.n for pain, with dry heat added. The infection subsided within 16 hours, and no new furuncles formed. The external canal had returned to its normal contour in three days; the patient's hospitalization lasted 2.5 days.

2. B. H. R., female, white, age 22. Had experienced two previous severe attacks of otitis externa, one in 1942 and one in 1943, the former of two weeks' duration and the latter requiring hospitalization of six days and home confinement of five days. Infection began first in the left ear, and was seen 48 hours after onset. Temperature was 99.8, and there was local aching with discomfort on swallowing or mastication. The canal was reddened, and the inferior and anterior walls were edematous with two staphylococcic abscesses present. The drum was injected but normal in contour. Penicillin therapy was instituted locally and intramuscularly, as above. A total of 100,000 units were given. The infection cleared in 18 hours, no local heat or other supportive measures being used. The right ear became infected 12 hours after the treatment of the left ear. This was treated in a similar manner and it returned to normal in 12 hours. The patient continued about her work. In comparison to her two previous experiences, it showed a marked contrast.

3. A. R. N., male, white, age 16. Mycotic infection of the left ear of 18 days' duration with the staphylococcus as a secondary invader. T. 100.2. When the myocotic crusts were removed from the left ear, a generalized staphylococcus infection was discovered beneath, forming four heads on the surface. The patient was put on penicillin therapy alone locally and a total of 160,000 units was given. The temperature subsided in 22 hours and there was complete recovery in 3.5 days. Hospitalization was for 2 days.

4. M. E. G., male, white, age 14. Developed staphylococcic left otitis externa 5 days prior to admission to hospital. T. 99.2. No abnormality of position of auricle; painful on pulling on pinna and tragus pressure. External canal was a vertical slit opening. There was furunculosis of the anterior and posterior walls. Penicillin wick was inserted and, in addition, dry external heat was applied directly to the ear. A total of 180,000 units was given intramuscularly. The temperature subsided after the first 24 hours and edema of the external canal abated at the end of 48 hours. No new formation of abscesses occurred. No symptoms were present at that time. The patient was discharged from the hospital and followed in the clinic for 5 days afterwards. At the second post-hospital day, the left ear canal was slightly injected.

5. A. H. C., male, white, age 31. Following swimming in a fresh water lake 9 days before, the patient developed an otitis externa in the left ear, for which, during the past four days, he had been given a phenol and glycerin mixture and sulfa drugs orally. T. 100.6. The pain, swelling and furunculosis nevertheless persisted. Two openings of the abscesses existed on the posterior wall. Local edema with pain radiating down left side of neck and in the cervical nodes were present. Generalized tenderness on manipulation of the auricle. The ear was debrided, and glycerin deposits were removed. Penicillin therapy was begun, and at the end of 48 hours the symptoms had disappeared. There was some redness of the canal with no new abscess formation. A total of 240,000 units of penicillin was

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given. The patient was seen in the clinic on the fourth post-hospital day, having no symptoms and only evidence of swelling was at the old furunculosis orifices on the posterior canal wall.

CONCLUSION

In comparison to other methods used in the 1943 series and all types of local therapy with the sulfonamides, the introduction of penicillin in treatment of otitis externa proved to be a marked advancement:

1. The severity of the infection was decreased.
2. Duration of the pathology was reduced to half of its former hospitalization of 4.5 to 2.2 days.
3. The staphylococcus infection did not extend to other areas.
4. There was a complete absence of complications in this series.
5. Other than local soreness resulting from intramuscular injections, no ill effects from the treatment were experienced.
6. Total duration of the illness with penicillin therapy was 4.5 days, while that of other methods of treatment was 11 days.

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Rural Medical Facilities.

A Committee of the Virginia Advisory Legislative Council is studying rural medical facilities with a view of ascertaining how the medical facilities and services available to the rural population can be improved. Members of the Committee are: Charles R. Fenwick, Chairman, Dr. J. M. Emmett, Clifton Forge; Dr. W. E. Garnett, Blacksburg; Senator M. M. Long, St. Paul; Dr. Henry B. Mulholland, Charlottesville; Dr. I. C. Riggin, Richmond; Dr. W. T. Sanger, Richmond; Dr. Philip Smith, Abingdon, and Dr. W. J. Sturgis, Nassawadox.

The Committee will hold a public hearing in Roanoke at the Hotel Roanoke on June 6 at 10 A. M. and in Luray on June 7 at 10 A. M. All persons interested are invited to attend and make known their views.

New Drug Holds Promise in Treatment of Typhoid Fever.

A promising new drug, related to penicillin in its germ-killing power, has been found useful in the treatment of typhoid—a disease for which heretofore there has not been a treatment of any value, it is reported in *The Journal of the American Medical Association* for May 19.

Hobart A. Reimann, M.D., William F. Elias, Ph.D., and Alison H. Price, M.D., Philadelphia, studied effects of the drug during a local typhoid epidemic in December, 1944. About 60 cases with 8 deaths were reported during the epidemic, all of them arising from a typhoid carrier in a bakery. Because amounts of the drug were limited, only 5 patients were selected for treatment and study.

The drug, streptomycin, is a nontoxic substance which, like penicillin, has an inhibiting or destroying action upon bacterial growth. It acts, however, upon some disease producing bacilli on which penicillin has no effect, including Eberthella typhosa, the microbe which causes typhoid.

Of the 5 patients treated by hypodermic injection with streptomycin, recovery took place in 3 during treatment. The authors point out that different strains of this germ vary in their resistance to streptomycin. This may explain why not all of the patients responded to the new treatment.

MYOSITIS IN CHRONIC RHEUMATISM AND CHRONIC GOUT

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The title of this article does not include rheumatoid arthritis, and its sole purpose is to call attention to the important role myositis plays in chronic rheumatism and chronic gout.

The two outstanding symptoms of these diseases are arthritis and myositis. Medical literature is prolific in its discussions of arthritis, but myositis, which always accompanies chronic rheumatism and chronic gout, and is the source of most of the pain, is scarcely mentioned. This is not wilful neglect but is due to the failure to recognize the muscular inflammation.

As a result of this failure, the passing over the myositis without recognition, there are thousands of sufferers going without adequate treatment. We cannot direct treatment toward the cause of these diseases, as the cause is unknown, but we can do much to remove the accompanying disability.

Hypothetically, the muscle is both a storehouse and a laboratory. Toxins of perverted metabolism and toxins of bacteria are carried to the muscle to be neutralized. Irritation is produced and this causes an exudate from the blood vessels; this process, repeated over and over, results in a permanent exudate, which gradually increases and with a tendency to organize.

As a result of this process, there is first a loss of resiliency in the tissues and then a gradually increasing induration. Thus, in chronic myositis, there is a massive exudate, producing pressure symptoms, and subject to recurrent attacks of acute inflammation with spasm and pain.

Fibrositis is an extension of the process and is of minor importance because of its limited involvement and its low vascularity, and, also, because of the lack of spastic qualities in the fibrous tissues.

With the vascularity of the muscle, exudates are readily formed; and, with its contractile power, pressure is applied and pain naturally follows.

Lumbar myositis is probably the worst offender; its manifestations show many vagaries. It often begins with mild attacks of lumbago which may increase in frequency and severity. In the advanced stage, there is a massive exudate, which, by pressure and muscular spasm, produces marked disability. It is at this stage of the disease that diagnoses of back strain, arthritis, sacro-iliac strain and sacro-iliac subluxation are made to explain the disability, and braces and belts are applied for immobilization; but undismayed, the disease continues to progress.

It is disastrous to immobilize muscular inflammation, as it increases blood stasis and therefore results in further exudates and increased pressure. During the very acute stage, the pain will splint the part sufficiently, and as the pain recedes, motion should be re-established as fast as possible. In other words, drainage of the tissues is essential for relief.

The same principle is involved in the treatment of contusions and sprains. The effect of a severe ankle sprain is like the breaking of a dam. Within a few hours, the tissues are flooded with exudates which result in severe pain. Any treatment, to be effective, must be directed to the drainage of the tissues and relief of pressure, and this means physiotherapy.

Lumbar myositis sometimes produces pain over the abdomen simulating an acute surgical condition. Occasionally, there is an almost constant dull ache over the abdomen.

A very important manifestation is sciatica. The majority of the cases of sciatica come from infiltration of the lumbar and gluteal muscles, but myositis anywhere along the course of the nerve may cause sciatica.

The shoulder muscles are frequently attacked, the deltoid being the favorite target; and if the condition is chronic, the fibrous tissues may be involved, and a deposit of calcium may accompany the inflammation. The shoulder involvement is often ascribed to neuritis, bursitis or arthritis. When the disease includes the pectoralis major, the discomfort may simulate cardiac pain.

The muscles of the forearm, especially the extensors, may be invaded and cause considerable disability. When the dorsal muscles are involved, the pain may not be localized and will radiate over the chest and along the costal margins.

The muscles of the leg as well as the plantar muscles are subject to the inflammation. The ad-

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ductor muscles of the thigh are occasionally involved, and when the condition is chronic, the legs are drawn together and locomotion is very difficult.

Inflammation of the muscles and ligaments around the joints is common and frequently mistaken for arthritis. X-ray of the knees in patients past middle life occasionally show bony spurs, but in our experience they never cause trouble, although they are usually held responsible for the overlying inflammation.

Until we learn to recognize pathology in the muscles in our physical examinations, we will continue to meet myositis with labels of arthritis, neuritis and bursitis. The only way to diagnose and appreciate the vast changes taking place in the muscles in these diseases is by constant practice of palpation. All the muscles of every patient with one of these diseases should be carefully palpated.

With constant practice, we learn to distinguish between diseased and normal tissue. It is time consuming, but the rewards are large. Physiotherapy is the only effective treatment.

Use New Method to Treat Migraine.

A new method for the treatment of migraine headaches by injections of a substance known as histamine is suggested from preliminary observations reported in *The Journal of the American Medical Association* for May 19.

Stuyvesant Butler, M.D., and William A. Thomas, M.D., of Chicago, who make the report, state that 34 patients with severe migraine were treated with histamine injected into a vein. Investigators had previously reported the administration of histamine by injection into a muscle without outstanding success. Dr. Butler and Dr. Thomas chose patients who could not conceivably have headaches from any other cause, such as sinusitis, eye-strain, neuralgia of the face or scalp, skull injury or brain tumors. Of the 34 patients, 24 became symptom free and 7 were improved.

The doctors caution, however, against the indiscriminate use of histamine. It is particularly dangerous if given to patients with peptic ulcer or high blood pressure.

One patient, a woman aged 32, suffered from very severe headaches, during which her speech was indistinct. Morphine injections often gave no relief. She was given three injections of histamine into a vein. Mild headache and heartburn was experienced during the first injection. She has had no return of headache for fourteen months.

Public Health as an International Problem.

In China disease is much more prevalent than it is here. Cholera is reported every year; there were 100,000 cases in 1932, 65,000 cases in 1942, 17,000 cases in 1943. Bubonic plague had approximately 6,000 cases in 1942. It is estimated that there are about 6,000,000 cases of dysentery annually, 90 per cent bacillary, 10 per cent amebic. The estimated number of cases per annum of typhoid fever is 700,000; of smallpox, 500,000; of diphtheria, 360,000; of scarlet fever, 180,000. Epidemic meningitis is estimated at 100,000 cases per annum; malaria, 21,000,000 cases per annum; schistosomiasis, 10,000,000 cases per annum. Active tuberculosis is estimated at 36,000,000 cases, 8 per cent of the population. Under-nutrition is so widespread that no figures of any kind are available. Raymond B. Fosdick, L.L.D., Amer. Jour. P. H., Nov. 1944.

CASE REPORT OF MATERNAL DEATH

MATERNAL HEALTH COMMITTEE,
MEDICAL SOCIETY OF VIRGINIA

This colored patient, aged 32, had a normal delivery of a full term living child 10 years ago. She first consulted her private physician for this present pregnancy in July, 1941, at which time she was 3½-4 months pregnant.

In September, 1941, the patient had a few lower abdominal cramps "spotting" and was put to bed. She developed night sweats, dry cough, and loss of weight. Sputum examinations were negative for tuberculosis. X-ray of chest was negative. The cough and loss of weight continued and in October, fluoroscopic examination of the chest was done by a consultant and was reported as negative. She was given adequate diet and tonics.

The patient was admitted to the hospital on November 26, 1941, about 7½-8 months pregnant and in premature labor. Examination showed rales throughout both lungs, temperature 102, pulse 140, respirations 48. The day after admission to the hospital the patient was given sulfathiazole, gr. 15, every three hours and morphine for cough. X-ray of chest was essentially negative except for marked elevation of the right diaphragm. There was no fluid in the chest and the costo-vertebral angles were clear. Laboratory studies revealed hemoglobin 80 per cent, red blood cell count 9,000, urine four plus albumin.

Two days after admission to the hospital the patient had a precipitate delivery of a premature, living child, weight 4 pounds 7 ounces. There were no lacerations or hemorrhage. No anesthesia used. Temperature after delivery 103 degrees. On the second postpartum day temperature 104 degrees and blood cultures negative. The third day postpartum, x-ray of chest revealed acute miliary tuberculosis throughout both lungs. Because of inadequate facilities for isolation in the hospital the patient was discharged and was followed by her physician. She continued to grow worse, developed laryngitis and died on the ninth postpartum day. This death has been classed by the committee as a medical death although one member stated that pregnancy was at least partly to blame.

It is generally agreed that tuberculosis in the negro may be more flagrant than it is in the whites, particularly when they get a rather heavy infection. It is our opinion that miliary tuberculosis is more apt to develop in the colored race than in the white, and may likewise be more fatal. This patient must have had miliary tuberculosis developing from about the time of the onset of her symptoms, namely September, 1941, and it is possible that the pulmonary manifestations of the disease had not developed to the point that they could be seen on the film which was taken in October. The development of miliary tuberculosis in this woman may have been purely coincidental in relation to the pregnancy, but when it once developed and got well underway, it may through its toxicity have caused premature labor, and premature labor by emptying the uterus, etc., could have added to the acuteness of her tuberculosis. We feel sure that had the diagnosis of miliary tuberculosis been made when the symptoms developed, any therapeutic procedures instituted at that time would not have influenced the outcome and would have hastened the end.

We feel that the individualization of each case of tuberculosis associated with pregnancy has given better results and we no longer believe promiscuous interruption justified.

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PUBLIC HEALTH

I. C. RIGGIN, M. D.,
State Health Commissioner of Virginia.

The report of the Bureau of Communicable Diseases of the State Department of Health for April, 1945, as compared with the same month in 1944, and for the period of January through April, 1945, compared with the same period in 1944, follows:

	April 1945	April 1944	Jan.-April 1945	Jan.-April 1944
Typhoid and Paratyphoid Fever	3	16	16	34
Diarrhea and Dysentery	118	205	930	679
Measles	275	4,514	905	13,142
Scarlet Fever	370	566	2,017	1,483
Poliomyelitis	1	2	13	4
Meningitis	23	61	120	323
Undulant Fever	5	2	8	12
Rocky Mountain Spotted Fever	1	0	2	1
Tularemia	1	1	13	17
Diphtheria	24	27	104	90

MATERNAL MORTALITY IN VIRGINIA

Definite progress is noted in decreasing maternal mortality in Virginia. In the first year of death registration in Virginia, 408 women died from complications incident to childbirth with a rate of 7.1 per 1,000 live births; while in 1944 the fatalities were reduced to 182 or a rate of 2.8. The gains registered have been more pronounced in the white race. The rate for the Negro has shown a considerable reduction, but has not been lowered, on a percentage basis, to the extent shown in the white population. Even so, had the general rate in 1944 been the same as in 1934, there would have been 426 maternal deaths last year instead of 182; hence 244 lives were saved.

Viewed from the standpoint of age, 16 women in the age group 15-19 years succumbed in 1944, 40 in the age bracket 20-24 years, 37 between the ages of 25-29, with 37 between 30-34, and 34 in the age group 35-39. Eighteen died in the 40 year and over classification. Thus, it is to be noted that 93 deaths, or 51 per cent of the total maternal deaths in 1944 were under 30 years of age—almost equal proportions being under and over 30 years.

Follows a tabulation of maternal mortality according to *cause* and *color* by 10-year periods:

It will be observed that a consistent decrease in *all rates* has been achieved during the entire period. From 1914 to 1944 the septicemia rate decreased 67 per cent (white 73 per cent, colored 58 per cent). The toxemia rate decreased 78 per cent (white 87 per cent, colored 59 per cent). Otherwise expressed, the total rate for septicemia deaths in 1944 was one-third of that in 1914; while the rate for toxemia deaths in 1944 was less than one-fourth that of 1914.

On a percentage basis, a little over one-third (36 per cent) of all puerperal deaths in 1944 were due to septicemia; not quite one-fourth (22 per cent) were caused by toxemia; and 42 per cent were attributed to other causes. Among the latter causes, 22 deaths were due to hemorrhage; 10 to ectopic pregnancy; 9 to abortion (other than septic and toxic); and 36 others were ascribed to difficult labor without mention of underlying causes.

	Septicemia						Toxemia						All Puerperal Deaths (inc. Septicemia and Toxemia)					
	Total		White		Colored		Total		White		Colored		Total		White		Colored	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
1914	179	3.0	88	2.2	91	5.0	159	2.7	92	2.3	67	3.7	487	8.3	261	6.5	226	12.3
1924	146	2.2	86	1.9	60	3.0	144	2.2	71	1.5	73	3.6	419	6.3	224	4.8	195	9.7
1934	107	2.1	68	1.8	39	2.6	111	2.1	52	1.4	59	3.9	337	6.5	196	5.3	141	9.3
1944	65	1.0	29	0.6	36	2.1	40	0.6	15	0.3	25	1.5	182	2.8	85	1.7	97	5.7

MATERNAL MORTALITY RATES: 1943

	United States				Virginia		
	Total	White	Negro	Other Races	Total	White	Negro
1943*	2.5	2.1	5.1	4.5	2.9	2.1	5.3

It is to be noted that the *total* rate for Virginia is now slightly higher than for the United States. The white rate for the nation and for Virginia are now exactly the same, while the Negro rate for the United States is slightly lower than that of Virginia.

*Latest year available for U. S.

WOMAN'S AUXILIARY
to the
MEDICAL SOCIETY OF VIRGINIA

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Hygeia.

Lest the women of Virginia forget to evaluate the importance of *Hygeia,* I should like to bring to your minds this valuable and authentic magazine.

It disseminates reliable information clearly and concisely in everyday terms that all may understand. The recognition of its worth, particularly by educators throughout the United States and the innumerable citations from its pages appearing regularly in digest publications and in other periodicals, indicate the manner in which *Hygeia* has become a source of information on health throughout the nation.

May I urge the AUXILIARY CHAIRMEN throughout the State to introduce *Hygeia* in the reading rooms of war industries, army camps, U.S.O. centers, as well as in the physicians' offices, where patients so often these days have to wait an indeterminate length of time.

MABEL L. DECORMIS,
(MRS. J. L)
Chairman, Hygeia Committee.

Cancer Control.

In this eventful and history making age, we have surely learned that we cannot afford to overlook dangers, even though they appear small and insignificant. This applies to world affairs, but one may also apply it to the world of medicine. Certainly the most important phase of medical effort today is cancer and cancer control.

One of the rules of nature is that everything begins small. This is certainly true of cancer—it starts small and doctors claim if taken in time it can be cured.

So many women, and I believe this applies to men too, put off going to a doctor because they are afraid their neighbors and friends might find out that they have that dreaded disease, cancer. They are willing to put pride before common sense and take a chance on their very lives. Often when they have conquered pride and ask the doctor for help, they have put off until it is too late. The result is the doctor is rendered helpless to do anything but bear the agony of seeing his patient die before his very eyes.

Let us take warning and avoid this dreadful mistake. The Virginia Cancer Foundation has literature telling how to recognize the signs and signals of cancer.

One cannot plead ignorance on medical subjects today, for there are so many skilled and wonderful doctors everywhere. These men love their profession and put the welfare of their patients before anything else.

Mr. George Gallup, Director of the American Institute of Public Opinion, says, "Cancer societies throughout the country are especially concerned with educating the public to a better knowledge of cancer symptoms. In January of this year there were, according to cancer authorities, 600,000 cases of the disease under treatment, and doctors claim that a large percentage of all fatal cases could have been cured if brought to a doctor in time. On the average, 18 people die of cancer in the United States every hour." This is an astounding fact and one which is hard to believe.

Everyone should read "Does Cancer Run in Families" by Waldemar Kaempfert in the February 17 issue of the *Saturday Evening Post.* It is a thrilling three-page account of recent developments in the battle for cancer control. The last sentence of this article says: "Meanwhile it is worth remembering that cancer can be successfully dealt with by the surgeon and the radiologist if its presence is recognized in an early stage." This is a cheering message to everyone and I am sure we can all take courage. Then let us not be ashamed if we have cancer but realize that going to a doctor for a physical check-up in time will mean much to all of us. In this way we can assist in the great work which is so vital to us all, the Control of Cancer.

CAROLINE D. CLARKSON,
(MRS. WRIGHT)
Chairman of Cancer Control.

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Dichloro-diphenyl-trichloroéthane

THE effectiveness of the third wonder drug of the war (sulfonamides, penicillin and DDT) was discovered because of a change in the monsoon season in East Africa. The Army had a satisfactory powder that would keep a man free from lice for about a week. One of the ingredients of this powder was pyrethrum. The early appearance of the monsoon in 1942 curtailed the supply of this substance from Kenya, the place from whence most of the pyrethrum came. The result was that a search for a substitute was begun.

In 1874 Othman Ziedler, a young student at Strasbourg, synthesized dichloro-diphenyl-trichloroéthane. This substance was first prepared commercially in Switzerland where it appeared on the market under the name *gesarol*. It was used to destroy certain agricultural pests. The Department of Agriculture called the military authorities' attention to this compound and extensive studies of its insecticidal and lethal properties were undertaken. These tests showed that it could be safely used. DDT, as it is called in Army parlance, kills insects either when ingested or when it merely comes in contact with them. It acts as a nervous system poison. For instance, mosquitoes after contact with an oily solution of DDT show no signs of being poisoned at first. After about 15 minutes they become agitated, take off abruptly and fly about in erratic drunken circles. In from 5 to 20 minutes they drop to the floor paralyzed, only to die several hours later. This reaction is so characteristic that it has been called "gesarol jitters", or DDT's.

The effectiveness of this new powder lasts much longer than any previously used. When a soldier's clothes are thoroughly dusted with DDT, he will remain free from lice a month. The repellent power of the clothing will last through several washings. The powder can be blown under the clothing with compressed air, so that the delousing can be done rapidly. In Naples some dusting stations deloused 5,000 persons a day and in all more than 1,250,000 persons were treated. The effect was little short of

miraculous. Not a single case of typhus has been reported among American troops in Italy, although there were fifty new cases a day in Naples when the invasion took place.

DDT has varied uses. Dissolved in oil it is much more effective as a larvacide than anything formerly used. It is effective even when used in infinitesimally small amounts. In quantities ordinarily used it is harmless to fish, water fowl and animals. We have seen it stated that dairy barns sprayed with DDT would remain free from flies for as long as a month. Whether this is one of the fantastic stories that were circulated after its adoption by the Army, we can not say. After the war, when it will be released for civilian use, it will undoubtedly find a great variety of uses.

Sir William Gowers, 1845-1915

THE *British Medical Journal* (March 31) takes the occasion of the 100th anniversary of the birth of Sir William Gowers to call attention to his place in Medicine. We are apt to think of him only as a neurologist, but he was really one of the founders of modern British Medicine. He was a great clinical observer and teacher. His published clinical lectures are models of perfect balance of observation and of judgment expressed in fluent, logical, and vital English. There still lives among neurologists a store of legends, handed down by his colleagues and his pupils, of his astonishing diagnostic skill and insight. "The lesson of this is that at the very foundation of sound medical practice lies a wide and deep familiarity with its material: the patient and his illness. Nothing can replace this, nor can all the ingenuity of the laboratory, nor the penetration of the skiagram, provide a substitute for direct observation at the bedside, the clinic, or the consulting room, and the unceasing contemplation of this direct experience. The complete physician, in fact, must be a connoisseur of clinical material, and not the least factor in the acquisition of this measure of skill and intuition is the careful and systematic recording of what has been observed." Gowers often referred to the benefit he had received from the two years in general practice with which he began his career. We are reminded that Osler constantly stressed the importance of taking notes and also the advantage to be gained from engaging in general practice. One of Osler's dictums was that no one should specialize until he had been in general practice five years.

Malarial Control on the Stilwell Road

VIRGINIANS are naturally interested in the road that General Lewis A. Pick built, for General Pick is a native Virginian and a graduate of V. P. I. The Press Censor of the India Burma Theater has just released the news of how the little known medical units in India and Burma have been winning a prolonged and exacting struggle against man's worst enemy, malaria. The India Burma Theater contains the world's worst malarial areas. The native population is infected almost 100 per cent. When the Stilwell Road was suggested, it was said that it could not be built, because of mosquitoes. The Indian and British troops in this same area in 1942 had suffered many times more casualties from malaria than from enemy action.

The Americans were inclined to heed the pessimistic predictions. Fortunately, there was an American doctor, Earl M. Rice, who for 20 years had operated his own hospital in Assam. He knew the country intimately, spoke the native language fluently, and had made a life time study of malaria. Tropical medicine was Rice's speciality. He was a member of the American Society of Tropical Medicine and a fellow of the Royal Society of Tropical Medicine. He was born in Hartford, Conn., in 1891, and grad-

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uated in Medicine at the University of Oregon in 1915. He claims South Carolina as his legal residence. Dr. Rice was commissioned a lieutenant colonel in the Army Medical Corps and was assigned the task of controlling malaria along the proposed route. With two survey units and two control units he set to work. The number of survey and control units increased tremendously as the work progressed. In Bengal the *anopheles philippinensis* was his chief enemy. In Assam, he had to contend with the *anopheles minimus,* propably the most vicious malaria carrier known. In the Hukawng valley he found not only the *minimus* but also its dread runner-up, the *anopheles leucosphyrus.* The Hukawng valley has remained uninhabited because of these two species. In spite of them the Americans built an all-weather road and fought the Japs to boot.

Besides the conventional drainage, Paris green and oil sprays, aerosol bombs were used against the mosquitoes. Millions of yards of hessian cloth were used to mosquito-proof billets. Wrists and ankles were covered at night and repellents were used. When the troops went to the movies they were sprayed at the gates. Late in 1944, DDT became available and it was used in the native villages. It was even sprayed from planes so as to cover large areas. The transient who moved in and out of protected areas was treated with atabrine, which at least protected him from the malignant type of malaria.

Thus the road was built. In many ways it recalls the digging of the Panama Canal. Here, too, the mosquito held up the works, and an American doctor made it possible to do the actual work. Just as General Gorgas' name will always be linked with the Panama Canal, so Colonel Rice's name will be linked with the Stilwell road. For the past 17 months Colonel Rice has served as medical adviser to Lord Louis Mountbatten in Ceylon.

PRESIDENT'S MESSAGE

TO THE MEMBERS OF THE MEDICAL SOCIETY OF VIRGINIA:

I am quoting below a letter just received from Mr. Frank Perrin, Secretary, War Committee on Conventions, Washington, D. C. This, of course, is from the Office of Defense Transportation.

"Your application for a permit to hold a House of Delegates Meeting in Roanoke, Virginia, October 22-23, 1945, at Hotel Roanoke, has been reviewed by the Committee. It is the consensus of the Committee that this meeting should be deferred. Therefore, permit is denied. This action does not preclude your holding a meeting attended by not more than 50 persons from out of town, plus local attendance without numerical limitation."

As you will see, he has denied us the privilege of holding our meeting of the House of Delegates. This matter is now being discussed with the Council by correspondence and you will receive further notice in the next issue. At least a meeting of the Council will be held at the time specified.

Sincerely yours,

H. B. MULHOLLAND, *President.*

Societies

The Alexandria Medical Society,

At its May meeting, elected the following as officers for the ensuing year: President, Dr. L. Floyd Hobbs; vice-president, Dr. C. E. Arnette; and secretary-treasurer, Dr. James A. Gooch. All are of Alexandria.

The Augusta County Medical Association

Held its regular quarterly meeting in Waynesboro on May 2, under the presidency of Dr. J. Hansford Thomas, Greenville. There was a good attendance and the following program was presented: Treatment of Fractures of Neck of Femur with Bone Pins by Drs. S. H. Garst and W. M. Phelps, Staunton; and Indications for Sulfonamides and Penicillin by Dr. H. B. Mulholland, University of Virginia.

The next meeting of this Association will be held in August. Dr. John H. Guss, Staunton, is secretary.

Roanoke Academy of Medicine.

At the meeting of the Academy on May 7, the following officers were elected to take office in October: President, Dr. T. J. Hughes; vice-presidents, Drs. Charles Irvin and B. P. Seward; and secretary-treasurer, Dr. G. S. Bourne. Members of the Executive Committee are Drs. A. M. Groseclose, F. A. Farmer, F. E. Hamlin, W. L. Powell, and C. W. Dorsey. The Judiciary Committee is composed of Drs. J. W. Preston, J. O. Boyd, W. R. Whitman, H. B. Stone, Sr., and W. W. S. Butler.

Dr. Linwood D. Keyser and Dr. David S. Garner are retiring president and secretary-treasurer, respectively.

News

The 7th War Loan

Is a challenge to every American. The goal for individuals is the highest for any war loan to date, but this year there will be only two War Loans instead of three as in 1944.

The 7TH WAR LOAN lasts until June 30. Each individual is urged to buy all the bonds he or she can.

The Virginia Society of Ophthalmology and Otolaryngology

Held its twenty-sixth annual meeting in Richmond, on April 28, under the presidency of Dr. James R. Gorman of Lynchburg. There were sixty-three in attendence for an excellent program which included the following:

President's Address—Dr. James R. Gorman, Lynchburg.

Management of Chronic Sinus Disease; A Critical Analysis of Modern Therapeutic Measures —Dr. O. E. Van Alyea (*Guest*), Chicago.

Further Report on Extraction of Cataract Through Vitreous (Motion Pictures)—Dr. G. M. Maxwell, Roanoke.

Hearing Aids: The Otologist's Problem—Dr. Joseph Krimsky (*Guest*), Charlottesville.

Post-Operative Infection in Eye Surgery—Dr. Edgar Childrey, Jr., Richmond.

A Preliminary Report on the Local Use of Penicillin in Otolarngological Infections—Dr. Fletcher D. Woodward and Dr. Thomas Holt, Charlottesville.

Advances in the Treatment of External Diseases of the Eye—Dr. DuPont Guerry, III, Richmond.

Control of Haemorrhage After Tonsillectomy: Use of Thrombin—Dr. Francis H. McGovern, Danville.

Delayed Post-Tonsillectomy Haemorrhage—Dr. H. Grant Preston, Harrisonburg.

Ophthalmoscopic Classification of Hypertensive Diseases—Dr. Grady Clay (*Guest*), Atlanta, Georgia.

Following luncheon there was a business session, at which time it was decided to hold the next meeting in Roanoke, and the following were elected officers for the coming year: President, Dr. Meade Edmunds, Petersburg; vice-president, Dr. Thomas E. Hughes, Richmond; and secretary-treasurer, Dr. Francis H. McGovern, Danville.

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News from the University of Virginia, Department of Medicine.

At the meeting of the University of Virginia Medical Society on Monday, April 2, Lt. Col. Brian Blades of the Medical Corps, USA, spoke on the subject, "Recent Observations on the Treatment of Wounds of the Chest".

Dr. Fletcher D. Woodward, Professor of Otolaryngology, spoke at the Indiana University annual clinical post-graduate course in otolaryngology on April 15 in Indianapolis. His subject was "The Local Use of Penicillin". On April 21 he spoke on the subject "Sinusitis Associated With Allergic Rhinitis" at a meeting of the Michigan Allergy Society in Ann Arbor. On April 22, Dr. Woodward gave two lectures for the Annual Post-Graduate Course in Otolaryngology at the University of Michigan. At the meeting of the Virginia Society of Otolaryngology and Ophthalmology held in Richmond on April 28, he also spoke on the subject "The General Uses of Penicillin in Otolaryngology".

On April 6 Dr. Peyton Rouss of the Rockefeller Institute of Medical Research gave the second of the annual Sigma Xi Lectures. He spoke on the cancer problem.

Dr. Henry B. Mulholland, Professor of Medicine, spoke before the Augusta County Medical Society at the meeting in Waynesboro on May 2 on the subject "Indications for Penicillin and Sulfonamides".

At the meeting of the University of Virginia Medical Society on Monday, May 7, a symposium was held on the subject "Penicillin". This symposium was conducted by Doctors George M. Lawson, Henry B. Mulholland, Dudley C. Smith, Bruno Barelare, and Thomas B. Holt, members of the faculty and staff of the University of Virginia Hospital.

The University of Virginia chapter of Alpha Omega Alpha Honorary Medical Fraternity held a formal initiation for three new members on Friday, May 11. Dr. Franklin M. Hanger, Associate Professor of Medicine at Columbia University Medical School, College of Physicians and Surgeons, gave the address on the subject "Recent Advances in the Study of Hepatitis".

Medical College of Virginia News.

Commencement exercises closing the 108th session of the college will be held on Saturday, Jun 16, at The Mosque, with Honorable Clarence W. Meadows, Governor of West Virginia, as the speaker. One hundred seventy-six graduates are expected to receive diplomas. In the medical graduating class are nineteen members who completed their first two years at West Virginia University and their junior and senior years at the college under the new cooperative plan with West Virginia.

Mr. Walter L. Beale, lately returned from duty with the United States Navy, has been appointed assistant to the president, to fill the vacancy left by Mr. George W. Bakeman. Mr. Bakeman has been given a leave of absence of one year to be Director of American Relief for France with headquarters in Paris.

Dr. Raymond D. Kimbrough of Norfolk has been appointed associate professor of dermatology and syphilology and of preventive medicine. Doctor Kimbrough is now located on the eighth floor of the college hospital. Dr. J. Warrick Thomas has been appointed associate in medicine; Miss Susanne Hirt, assistant professor of applied anatomy in the Baruch Center of Physical Medicine; and Dr. Donald E. Stader, assistant professor of pathology.

Dr. Harry Bear, Dean of the school of dentistry, was awarded the honorary degree of doctor of science by Temple University at their graduating exercises on April 14.

Virginia Society for Pathology and Laboratory Medicine.

The formal organization of this Society has been completed and the following officers elected: President, Dr. W. E. Bray, Charlottesville; vice-president, Dr. M. B. Beecroft, Newport News; secretary-treasurer, Dr. Thomas M. Peery, Alexandria; and councilors, Drs. J. H. Scherer, Richmond, and M. L. Dreyfuss, Clifton Forge. The Society numbers among its members most of those physicians practicing Pathology in the State of Virginia, and will welcome an application from any qualified Pathologist in the State who is not already a member. This Society is one of the specialty Societies affiliated with the Medical Society of Virginia.

Dr. Glenn H. Baird

Resigned as Health Officer of Smyth-Washington-Bristol Health District, effective as of May 10, to accept a commission with the U.S. Naval Reserve.

Doctors in Service and Promotions.

Two Virginia doctors who have recently entered the Service are:

Dr. Glenn H. Baird, Abingdon.

Dr. Alexander McCausland, Radford.

Promotions have recently been noted for the following Virginia doctors:

To *Commander:*

Dr. E. L. Alexander, Newport News.

To *Major:*

Dr. Henry C. Davis, Bluefield.

Dr. Thomas W. Murrell, Jr., Richmond.

Dr. Milton Salasky, Norfolk.

To *Captain:*

Dr. Lemuel E. Mayo, Portsmouth.

Colonel Joseph E. Cox of Waynesboro is serving as Commanding Officer of the 114th Station Hospital at a base in Italy—an important service and supply organization for the 5th Army and the ground forces of the U. S. Air Corps and Navy in Italy. This hospital has been a Neuropsychiatric Unit, the only one of its kind in the Italian War Theatre.

Major James R. Grinels of Richmond wrote recently, "I have been receiving the VIRGINIA MEDICAL MONTHLY from time to time, and have enjoyed it." He was assigned Chief Surgeon of the 112th Evacuation Hospital (sem). They were doing active surgery through France and into Germany.

Brigadier General Guy B. Denit, class of '16, Medical College of Virginia, who stayed in the regular army after serving in World War I, has made a name for himself in the malaria-control work in which he has been engaged in the Pacific.

The Richmond Eye, Ear, Nose and Throat Society

Held its regular meeting in the Founders Room of the Medical College of Virginia on May 8, with the President, Dr. Luther C. Brawner, presiding. Dr. Walter J. Rein presented a motion picture about contact lenses and, following this, Dr. Rein demonstrated the materials used and explained the facilities for getting contact lenses in Richmond.

Dr. James O. Fitzgerald,

Richmond, Guilford College graduate of the class of 1905, was elected president of the Richmond Chapter of the Alumni Society of the college at a dinner meeting on April 26.

American College of Chest Physicians.

The Board of Examiners of the College announce that the next written examination for Fellowship will be held at Chicago, June 16. Candidates for Fellowship in the College who plan on taking the examination should contact the Executive Secretary of the American College of Chest Physicians, 500 North Dearborn Street, Chicago 10, Illinois.

Virginia Cancer Foundation.

At the annual meeting held on April 28, Dr. I. A. Bigger, Richmond, was elected president and Dr. George Cooper, University of Virginia, director of the Foundation. Dr. Edwin P. Lehman, University, was elected to fill the new office of advisory director. Doctors serving on the board of trustees are: Drs. Arthur Gathright, Jr., Richmond; Julian L. Rawls, Norfolk; R. G. Beachley, Arlington; James R. Cash, Charlottesville; J. M. Emmett, Clifton Forge; R. W. Garnett, Danville; I. C. Riggin, Richmond; A. M. Showalter, Christiansburg; J. Shelton Horsley, Richmond; and Dr. Lehman.

Dr. H. M. Richardson,

Midlothian, has been reappointed a member of the Trustee Electoral Board of Chesterfield County for a term of four years.

Dr. Meade C. Edmunds,

Petersburg, has been elected a director of the local Lions Club for a term of two years.

Home for Convalescent Patients.

A limited number of convalescent patients may be cared for in the private home of a graduate nurse. For details and rates, write or phone Mrs. D. C. Wills, Arrington, Virginia. (*Adv.*)

For Sale.

Laboratory rabbits. We can handle large or small orders and have a constant supply. Contact us for your needs. Bonnie Brae Rabbitry, Route 12, Richmond, Virginia. Dial 5-2421. (*Adv.*)

For Sale.

General Electric, Model R-38, 39, Diagnostic X-Ray Unit, combination Radiographic and Fluoroscopic, with standard Bucky diaphragm 200/260 v; 60 cy. Also holder for chest work. Used by private practitioner only one year previous to entering military service. All accessories available. Excellent condition, put away by G. E. agent. Cash sale only. Address Mrs. J. W. Sinclair, Warrenton, Virginia. Telephone Warrenton 168. (*Adv.*)

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For Sale—

Hanovia Alpine ultra-violet sun lamp. Hot quartz burner. Cost $500.00. No reasonable offer refused. Write Mrs. J. Frasia Jones, 928 West Franklin Street, Richmond 20, Va. (*Adv.*)

For Sale—

Town and country practice on main highway in Valley of Virginia. Home available if desired. Write Dr. E. W. Dodd, Buchanan, Va. (*Adv.*)

Obituaries

Dr. Benjamin Ashby Pope,

Newsoms, prominent physician of Southampton County, died April 18, at sixty-nine years of age. He was a graduate of the Medical College of Virginia in 1898, and joined the Medical Society of Virginia that year. His County Society has expressed the following appreciation of him:

The Southampton County Medical Society deeply regrets the loss of their fellow member, Dr. Benjamin Ashby Pope (1875-1945). We have learned to regard him as an example of one of the most outstanding Christian personalities in our midst. His unselfish devotion and kindness to the people of his community shall be greatly missed. Dr. Pope reared a family of outstanding abilities and each of the children has demonstrated the example of living that was exemplified by him. During his forty-seven years of medical practice he served with devotion the sick and needy without thought of compensation. His entire life was devoted to the welfare of anyone he could help professionally or as an advisor. To his door problems of health and everyday living were brought. Throughout the years he gained the utmost respect from everyone that knew him and was revered by all because of his Christian character and example of following the principles that made him the beloved physician and citizen to each of us. In his passing we wish to extend our sympathy to each member of his family and the community and church that he so dearly loved.

We, the members of the Southampton County Medical Society, resolve that this resolution be sent to the family of Dr. Benjamin Ashby Pope and to the VIRGINIA MEDICAL MONTHLY.

MORGAN B. RAIFORD, *President,*
Southampton County Medical Society.

Major David B. Stuart.

News has been received of the death of Major Stuart of Roanoke, which occurred in Belgium on April 14, following a coronary attack two days previously. He was a graduate of the Medical College of Virginia in 1924 and, after completing an internship, he practiced for a time in Dublin before locating in Roanoke where he was engaged in general practice until he volunteered for duty in the armed forces in July 1942. He went overseas in October 1943. He had been a member of the Medical Society of Virginia for twenty years. His wife and three children survive him.

At the regular meeting of the Roanoke Academy of Medicine on May 7, 1945, the following resolutions were adopted:

It is with deep regret that the Roanoke Academy of Medicine has learned of the departure of Dr. David B. Stuart who passed away while serving with the armed forces in Belgium on April 14, 1945.

We wish to extend to his bereaved family our deepest sympathy and to express to them our sincere appreciation of Dr. Stuart as a fellow practitioner, as a friend, and as one who has made the supreme sacrifice in the service of his country.

To say that he was loved and esteemed by all who knew him expresses, as nearly as words can, his position in our community.

BE IT RESOLVED that a copy of these resolutions be sent to his family, to the local newspapers, and to the VIRGINIA MEDICAL MONTHLY.

J. H. BAILEY,
C. W. DORSEY,
DAVID S. GARNER,
Committee.

Dr. John William Smith,

Branchville, died on February 25 of coronary disease. He was a native of North Carolina and seventy-three years of age. He graduated in medicine from the University of Maryland in 1906 and shortly thereafter located at Branchville where he had since made his home. Dr. Smith was a local surgeon for the Seaboard Air Line Railway, and had been a member of the Medical Society of Virginia for thirty-five years.

Lt. (jg) Belton Allen Bennett, Jr., MC, USNR,

Class of '38, University of Virginia Department of Medicine, died about December 3, 1944. He was a surgeon aboard the U.S.S. Cooper which was torpedoed and sunk in Ormoc Bay, off Western Leyte. After graduation, he served an internship and residency at St. Luke's Hospital, Bethlehem, Pa., and a residency at Doctors Hospital in Washington, D. C. He received the degree of master of science in surgery from the University of Pennsylvania in 1943, and entered the Navy in September of that year from Greer, S. C.

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